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LEOPARD HUNTING.



[Tree Leopard at Bay.]

The leopard of Southern Africa is known among the Cape colonists by the name of *tiger*; but is, in fact, the real leopard, the *felis jubata* of naturalists. It differs from the panther of Northern Africa in the form of its spots, in the more slender structure of its body, and in the legs not being so long in proportion to its size. In watching for his prey the leopard crouches on the ground, with his fore-paws stretched out and his head between them, his eyes rather directed upwards. His appearance in his wild state is exceedingly beautiful, his motions in the highest degree easy and graceful, and his agility in bounding among the rocks and woods quite amazing. Of this activity no person can have any idea by seeing these animals in the cages in which they are usually exhibited in Europe, humbled and tamed as they are by confinement and the damp cold of our climate.

The leopard is chiefly found in the mountainous districts of South Africa, where he preys on such of the antelopes as he can surprise, on young baboons, and on the rock badgers or rabbits. He is very much dreaded by the Cape farmers also, for his ravages among the flocks, and among the young foals and calves in the breeding season.

The leopard is often seen at night in the villages of the negroes on the west coast; and being considered a sacred animal, is never hunted, though children and women are not unfrequently destroyed by him. In the Cape Colony, where no such respect is paid him, he is shyer and much more in awe of man. But though in South Africa he seldom or never ventures to attack mankind, except when driven to extremity (unless it be some poor Hottentot child now and then that he finds unguarded), yet in remote places, his low, half-smothered growl is frequently heard at night, as he prowls around the cottage or the kraal, as the writer of this notice has a hundred times heard it. His purpose on such occasions is to break into the sheep-fold, and in this purpose he not unfrequently succeeds, in spite of the troops of fierce watch-dogs which every farmer keeps to protect his flocks.

The leopard, like the hyæna, is often caught in traps constructed of large stones and timber, but upon the same principle as a common mouse-trap. When thus caught, he is usually baited with dogs, in order to train them to contend with him, and seldom dies without killing one or two of his canine antagonists. When hunted in the fields, he instinctively betakes himself to a tree, if one should be within reach. In this situation it is exceedingly perilous to approach within reach of his spring; but at the same time, from his exposed position, he becomes an easy prey to the shot of the huntsman.

The South African leopard, though far inferior to the lion or Bengal tiger in strength and intrepidity, and though he usually shuns a conflict with man, is nevertheless an exceedingly active and furious animal, and when driven to desperation becomes a truly formidable antagonist. The Cape colonists relate many instances of frightful and sometimes fatal encounters between the hunted leopard and his pursuers. The following is a specimen of these adventures. It occurred in 1822, when the present writer was in the interior of the colony, and is here given as it was related to him by an individual who knew the parties engaged in it.

Two African farmers, returning from hunting the hartebeest (*antilope bubalis*), roused a leopard in a mountain ravine, and immediately gave chase to him. The leopard at first endeavoured to escape by clambering up a precipice; but being hotly pressed, and wounded by a musket-ball, he turned upon his pursuers with that frantic ferocity peculiar to this animal on such emergencies, and springing on the man who had fired at him, tore him from his horse to the ground, biting him at the same time on the shoulder, and tearing one of his cheeks severely with his claws. The other hunter seeing the danger of his comrade, sprang from his horse and attempted to shoot the leopard through the head; but, whether owing to trepidation, or the fear of wounding his friend, or the quick motions of the animal, he unfortunately missed. The leopard, abandoning his prostrate enemy, darted with redoubled fury upon his second antagonist, and so fierce and sudden was his onset, that before the boor could stab him with his hunting-knife, the savage beast struck him on the head with his claws, and actually tore the scalp over his eyes. In this frightful condition the hunter grappled with the leopard; and, struggling for life, they rolled together down a steep declivity. All this passed far more rapidly than it can be described in words. Before the man who had been first attacked could start to his feet and seize his gun, they were rolling one over the other down the bank. In a minute or two he had reloaded his gun, and rushed forward to save the life of his friend. But it was too late. The leopard had seized the unfortunate man by the throat, and mangled him so dreadfully, that death was inevitable; and his comrade (himself severely wounded) had only the melancholy satisfaction of completing the destruction of the savage beast, already exhausted with the loss of blood from several deep wounds by the desperate knife of the expiring huntsman.

A SALT LAKE IN SOUTH AFRICA.

This lake, which lies in the midst of an extensive plain, elevated considerably above the level of the sea, is of an oval form, about three miles in circumference, and has on one side a sloping margin of green turf; on other parts, banks of greater elevation and abruptness are covered with continuous thickets of arboreous and succulent plants. At the time of our visit the whole of the lake round the margin, and a considerable portion of its entire surface, was covered with a thick rind of salt sprinkled over with small snow-white crystals, giving the whole basin the aspect of a pond partially frozen and powdered over with hoar frost or flakes of snow. This wintry appearance of the lake formed a singular contrast with the exuberant vegetation which embowered its margins, where woods of beautiful evergreens and elegant acacias were richly intermingled with flowering shrubs and succulent plants of lofty size and strange exotic aspect,—such as the *portulacaria afra* (the favourite food of the elephant), the tree *crassula*, the scarlet *cotelydon*, many species of the *aloe*, some throwing out their clusters of flowers over the brink of the lake, others elevating their superb [illegible]ras of blood-red blossoms to the height of twelve or fifteen feet; and, high over all, gigantic groves of *euphorbia*, extending their leafless arms above the far-spread forest of shrubbery. The effect of the whole, flushed with a rosy tinge by the setting sun, was singularly striking and beautiful.

I did not attempt to examine the saline incrustation which, according to Mr. Barrow's account, is said to extend over the whole bottom of the lake; but I tasted the water, and found it as salt as brine. Of the various theories suggested by naturalists to account for the formation of this and similar lakes in South Africa, that which ascribes their origin to salt springs appears the most probable.

ÆSCHYLUS.

The subject of the Prometheus Bound of Æschylus one of the noblest conceptions of the Athenian drama expressed in a language that will always give delight, and excite a sympathy in every congenial breast. Prometheus, himself a God, the giver of the gift of fire to mortals,—the friend of man, who taught the shivering, starving wretch the useful arts of life,—is bound down by the command of Jupiter to the snow-clad rocks of Scythia, as a punishment for his beneficent intentions. But though conquered, the spirit of the friend of humanity is not subdued. Stern, unyielding, unfearing, his noble nature braves the cruelty of his tyrant; and, far from bending to sue for mercy, he is ready to endure till, in the fullness of time, the decrees of fate shall be accomplished, and Jupiter shall yield his throne to one mightier than himself.

Old Ocean, who comes to console him in his misfortunes, and offers to be the bearer of a petition to Jupiter in his favour, is answered thus:

Prometheus.—I commend thy good intentions, and I will never cease to do so; for in zeal thou art not lacking. But trouble not thyself, for all in vain, and all bootless to me, will thy labour be,—labour thou ever so much. Be quiet, and keep thyself out of harm's way; for if I am wretched, I do not therefore wish to have others to share my miseries. No: already I grieve enough for the sorrows of my brother Atlas, who stands, in the regions of the west, the pillar of heaven and earth, bearing on his shoulders no easy weight. I have seen, and pitied too, the earth-born dweller in the caverns of Cilicia, the prodigious giant, hundred-head impetuous Typhon, by force subdued who opposed all the Gods, spouting forth blood with horrid mouth; and from his eyes he flashed a terrific light, as if he would overturn the sovereignty of Jupiter. But Jove's sleepless bolt descended on him—the down-rushing lightning breathing forth flame—and beat him from his high-flown boastings. Struck to the innermost seat of life, his strength was reduced to ashes, and his power was destroyed by the thunder. And now he lies a withered and outstretched carcase, near the narrow straits of the sea, baked beneath the roots of Ætna. On the summit Vulcan sits, and forms the glowing mass: and hence shall streams of fire hereafter burst, eating up with devouring mouth the level plains of fertile Sicily*. Such fury shall Typhon breathe forth in warm showers of unceasing fiery hail, though reduced to a cinder by the bolt of Jupiter. But thou, Ocean, art not without experience, and wantest not me as a teacher. Save thyself as thou best can. But as for me I will bear my present sufferings till the mind of Jupiter shall relent from its wrath.

Prometheus addresses the Chorus who are sympathizing with his misfortunes.

Prometheus.—Think not that I am silent through

* Æschylus is here evidently alluding to an eruption of Ætna, which took place B.C. 476, some time before he went to Sicily, and is mentioned by Thucydides in the last chapter of his third book. Though the Prometheus may have been written before the eruption, this passage may also have been inserted afterwards. Æschylus was born B.C. 525.

pride or stubbornness, but I am w[illegible] thought, at seeing myself thus shamefully treated, [illegible] heart with but myself securely fixed for these new Gods their several privileges? but I say no more about this, for I should tell the tale to you who know it well. But as to the once wretched state of man, hear while I relate how I gave understanding to him who was ignorant as an infant, and made him the possessor of knowledge. And I shall say this, not that I have aught for which to blame mankind, but to show the goodwill with which I helped them. Seeing they saw not, and hearing they heard not, but like the phantoms of a dream they had long jumbled all things in utter confusion. They knew not how to raise brick-built houses turned to receive the sun,—they knew not the art of fashioning wood; but like ants in the sunless recesses of caves, they dwelled deep-burrowing in the earth. And they knew not the signs of winter, nor of flower-bringing spring, nor of fruit-bearing autumn; but they did every thing without forethought, till I pointed out to them the risings of the stars, and their settings, difficult to discern. And I invented for them Number, the first of arts, and the putting together of letters, and Memory the mother of the Muses, the parent of all things. And I first bound animals to the yoke obedient to the collar; and that he might relieve man from his greatest toils, I brought under the chariot the horse obedient to the rein, an ornament of luxurious wealth. And none before me invented the sea-beaten, flaxen-winged chariot of the sailor. Such inventions, wretch as I am, I have devised for mortals; and now I have none left by which I may escape from the sorrows that I suffer.

THE LABOURERS OF EUROPE.—No. 5.

The Portuguese labourers and peasants differ considerably in their appearance and manners from their neighbours of Spain, and especially from the Castilians. They have neither the pride nor the sternness of the latter. Their bearing is less solemn, their language less sententious, as it is also less sonorous in its sounds. Most travellers who have visited both countries, prefer the Portuguese peasant: he is more sociable, manageable, and good-humoured than the Spanish. "In Portugal," says Costigan, "the lower you descend in rank, the higher the personal character of the people rises upon you. The higher classes are as inferior to the Spanish ones, as the common people excel the corresponding class in Spain." Mr. Link says, "The civility, the easy, gay, and friendly manners of the common people prepossess a stranger in favour of the Portuguese rather than the Spaniards, but it is quite the reverse with the higher orders." Notwithstanding these favourable testimonies, which are grounded upon casual intercourse, we think, upon the whole, the national character stands higher in Spain, and that even the peasantry of the latter country have in them more elements of a great and independent people than the Portuguese. The latter, however, are certainly very patient under privations, generally honest, attached to their country, and courageous.

The Portuguese peasant in general lives very poorly. His bread is made of *milho* or Indian corn flour; it is sweetish to the taste, heavy, and crumbles to pieces on breaking it. *Bacalhao*, which is a sort of salted ling or stockfish, sardines, which are fished in great quantities off the coast of Portugal, garlic, onions, lupines, a few olives,—these form his common food. Wheaten bread is an article of luxury; meat is seldom tasted by the villagers. Portugal, with the exception of the province of Alemtejo, produces but little wheat and barley, less rye, and hardly any oats. The Indian corn is usually sown in March and April. When the sprout is about an inch high, the earth round it is moved with a hoe in order that the root may spread and acquire vigour. Its growth is greatly assisted by moderate showers; but a too rainy season is injurious to the harvest. When the cane or stalk has attained several inches in height the ground [illegible] trenching is [illegible] up again; and a third above the ground. The leaves of the [illegible] one foot serve to feed the cattle, as very little hay is made in Portugal.

The olive crop, which is another important produce of Portugal, is ripe in December or January. The olives are beaten off the trees with poles, and not plucked with the hand as in the south of France, or at Genoa and Lucca; this is one reason why Portuguese oil is inferior. Some farmers press the olives immediately, others shoot them down in heaps, throwing salt on them, and suffering them to ferment, by which they obtain more oil but of inferior quality. An absurd old privilege is mentioned by Mr. Kinsey * as still existing, by which the *fidalgos* or nobles, and the religious corporations, have alone the right of keeping oil-presses, so that the farmers or small proprietors must wait until they can borrow the use of them after the others have done. In consequence of this, they are obliged to keep their crops sometimes till May or June, when the fruit has become spoilt. The presses are worked by oxen, and the corn in most places is also trodden by oxen on a temporary floor made in the field.

The houses in the Portuguese villages have a very primitive appearance. They consist in general of the ground floor only. The walls are of extreme thickness, built of large rough stones, and the beams and framework of the roof are proportionally massive; the roof is covered with tiles. The outer walls are whitewashed, the windows are not glazed, and the shutters, which close badly, are not painted any more than the doors. The lowness of the houses, and their dingy colour, prevent them from being discernible at a distance from among the surrounding trees and garden walls; and the traveller often stumbles, as it were, upon a Portuguese village before he is aware of being near one. The interior of most villages, as well as the inside of the houses, presents a scene of squalidness and filth unequalled perhaps in any other country of Europe, Poland excepted. The contrast on the frontiers, between Spain and Portugal, is decidedly to the advantage of the former. As you pass from the Portuguese province of Beira into the Spanish province or "Kingdom" of Leon, which is by no means one of the most favoured divisions of Spain, the villages of the latter, only a few miles beyond the border, are clean, decent, and comfortable, compared to those of their neighbours. There is also a glow of healthiness and a manly look and bearing in the Spanish villagers, very superior to the dejected appearance and mean attire of the others. There are, however, districts in Portugal which form an exception to these remarks. The fine province of Entre Douro e Minho, with its numerous towns and villages, five hundred parishes, and a population of nearly a million of inhabitants, although the smallest in extent, is the most fertile and best cultivated in the kingdom, and that in which the inhabitants appear most industrious and comfortable. This is the great country for wine which is shipped at Oporto. The neighbourhood of Lisbon also presents some fine districts, as well as the valley of the Mondego above Coimbra. There you meet with better built villages, and some pretty *quintas* or country-houses. But a great part of the country is barren, rocky, or uncultivated; the *fidalgos* or great landed proprietors reside in the towns, and leave the mana[illegible]ce of their estates to agents or speculators who have adva[illegible] them money on the rent, and who oppress the ten[illegible] The crown lands are in a state of neglect; the convent lands are better cultivated. The farmers are poor and cannot afford to make improve-

* Portugal illustrated in a Series of L[illegible]—London, 1828.

ments. They consult the almanac for directions in their rural labours, and sow the same sort of seed year after year on the same field as their fathers did, and them. The plough and harr[illegible]uguese carts are remark- drawn by bullo[illegible]ness. The wheels are of a solid piece about three feet in diameter, and are fixed to the axletree which moves round with them, producing a grating noise peculiarly offensive to the ear. The carman walks by the side of the bullocks, pricking them with his goad to urge them on. In this manner the ponderous machine rolls heavily forward, jolting dreadfully on the wretched roads which are impassable for any other sort of vehicle. The wounded soldiers during the late war, who were conveyed away in these carts after an action, sorely felt the misery of this mode of conveyance. In the wine districts of the Douro it requires a whole day for two bullocks to drag a pipe of wine six or seven miles, and two men to prevent the cart from being overturned. Donkeys and mules, but chiefly the former, constitute the other means of conveyance. The donkeys are fine and strong, and extremely useful to the country people. The gentry travel in *liteiras*, a sort of sedan chairs carried by two horses or mules.

The Portuguese peasant always goes armed with his *cajado*, a staff about seven feet long, having a heavy knob or leaden charge at one end, which he uses with great dexterity. It is, in truth, a formidable weapon in his hands. The *capote* or cloak is of universal use as in Spain.

The population of Portugal is stated by Balbi at three millions and a half, of which Lisbon and its comarca or surrounding territory contain above half a million.

BRITISH MUSEUM.—No. 9.

THE ELGIN MARBLES.

THE statues of Theseus and the Ilissus given in our last article on the Elgin Marbles, although much dilapidated, have suffered less than most of the other figures which ornamented the pediments of the Parthenon. The subjects of these sculptures were, the Birth of Minerva, on the eastern pediment; and on the western, the Contest between Minerva and Neptune for the honour of giving birth to the city of Athens. The whole arrangement of those groups may be seen in Stuart's celebrated work on Athens. The figures which are in the best preservation, after the two above-mentioned, are those of the two goddesses (No. 94), probably Ceres and her daughter Proserpine, and a group (No. 97) of the three Fates. This last is placed immediately opposite the door of the new apartment in the Museum which is appropriated to those works; and the length of the passage which leads to it affords an opportunity of viewing this group at a distance, sufficient to perceive and appreciate its entire effect. When seen near at hand, there appears, in these figures particularly, to be something small and wiry in the execution of the draperies differing essentially from the general breadth and largeness of style which characterizes the Elgin Marbles. But the sculptor's intention becomes apparent when the group is seen in its present situation; the figures form into the finest masses, and the sharp and multiplied lines give an air of lightness and delicacy proper to female drapery.

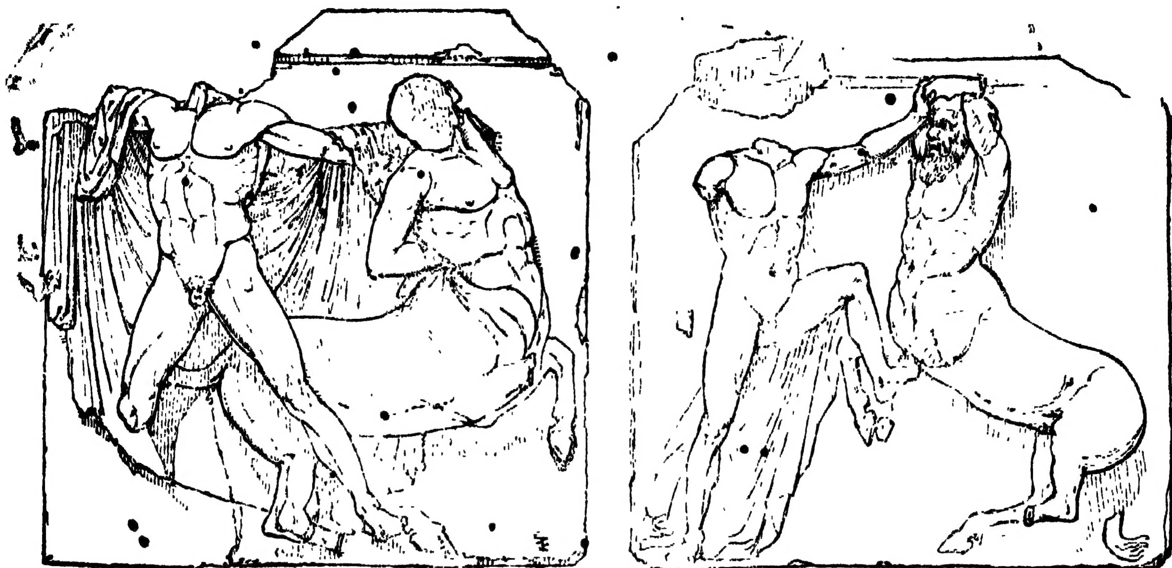
Our attention is next engaged by the Metopes, a series of figures in very high relief, which, alternately with the triglyphs, ornamented the frieze of the entablature surmounting the colonnade of the Parthenon; the subjects are the same throughout: the contests of the Centaurs and Lapithæ, or rather between the Centaurs and the Athenians, who, under Theseus, became the allies of the Lapithæ. These groups exhibit great spirit and variety of action; their fine contours, however, are never disfigured by violent and extravagant contortions. Victory seems doubtful: here an Athenian, and there a Centaur, seems to triumph; and the composition is occasionally varied by the introduction of the female figures whom the Centaurs are endeavouring to bear away. These alto-relievos are executed with great boldness and vigour. We have selected two from the series, which are numbered from 1 to 16.

There is no portion of the Elgin Marbles by which our attention is more strongly arrested, or which more strikingly evinces the high excellence which art had attained at the epoch in which they were executed, than the sculptures which compose the exterior frieze of the Cella of the Parthenon. This series was continued in an uninterrupted succession entirely round the temple. It is in very low relief, and represents the sacred procession which took place at the great Panathenæa, a festival which was celebrated every fifth year, at Athens, in honour of Minerva, the patroness of the city. Those sculptures which occupied the principal front of the temple, namely, the east, commence on the left hand of the visitor as he enters the room of the Museum, then follow those of the north, and lastly, those of the west and south. The arrangement has been made, as nearly as could be ascertained, according to the original order in which they stood in the Parthenon.

In that portion of the frieze which ornamented the east end of the temple are representations of divinities and deified heroes: Castor and Pollux, Ceres and Triptolemus, Jupiter and Juno, and Æsculapius and Hygeia. On the right and left of these sacred characters are trains of females bearing offerings to the gods. At intervals, officers appear whose duty it was to superintend and regulate the solemnity, (No. 23). These females led the procession, both on the north and south side of the temple, and were followed by the charioteers, horsemen, victims, &c., which formed a procession up to the same point in two separate columns.

The subjects comprised in the frieze taken from the north side of the temple are chiefly composed of charioteers and horsemen. Some among these are considered pre-eminently excellent. The two groups (Nos. 39 and 42), given in the wood-cut, will afford a general idea of the style and arrangement of these figures. Those from the western frieze appear to be rather preparing for the procession than engaged in it: and the subjects on the southern side are diversified by the introduction of victims, chiefly oxen, which are led on for the purpose of sacrifice.

These fine performances have suffered so much from time and violence, that the visitor may not perhaps at a first view be struck with their extraordinary excellence; but we are certain that no one possessing a tolerable natural taste will repeat his inspection of them frequently, without becoming sensible of their beauties. For the due appreciation of those works, no technical acquaintance with art is necessary: they are executed in that style of consummate mastery which discards the parade of recondite knowledge, and addresses itself to the spectator in the broad and general language of nature. It is not only in the human figure that the profound skill of these works is evinced. When we look at the horses in the frieze, we are almost tempted to think that beautiful animal has never elsewhere been adequately represented, either in sculpture or in the more tractable material of painting. Even the horses of Rubens, admirable as they are, are individual; but those of the Elgin Marbles exhibit throughout the *generic* character of the animal: and it is impossible to look on the succession of groups here represented, in every variety of action, without feeling animated and exhilarated as if the procession were really passing before us. The most casual observer must be struck with the grace and elegance of the riders, who seem formed indeed "to witch the world with noble horsemanship." The fire and vivacity of those figures are finely contrasted with the devout and reverential air of the females who lead the procession.



[Metopes.]



(23) [East side of the Frieze.]





(42) [North side of the Frieze.] (30)

THE DAYS OF CREATION.

FROM THE GERMAN OF KRUMMACHER.

As dead and silent was the earth,
In deepest night it lay— [illegible] word,
The Eternal [illegible] being, Day.
Chor. It streamed from on high,
All reddening and bright,
And angels' songs welcom'd
The new-born light.

God spake: the murmuring waters fled,
They left their deep repose,
Wide over-arching heaven's blue vault
The firmament arose.
Chor. Now sparkles above
Heaven's glorious blue,
It sends to the earth
The light and the dew.

God spake: he bade the waves divide;
The earth upreas her head;
From hill, from rock, the gushing streams
In bubbling torrents spread.
Chor. The earth rested quiet,
And, poised in the air,
In heaven's blue bosom
Lay naked and bare.

God spake: the hills and plains put on
Their robe of freshest green;
Dark forests in the valleys wave,
And budding trees are seen.
Chor. The word of his breath
Clothes the forest with leaves,
The high gift of beauty
The spring-tide receives.

God spake: and on the new-dress'd earth
Soft smiled the glowing Sun,
Then full of joy he sprung aloft,
His heavenly course to run.
Chor. Loud shouted the stars
As they shone in the sky,
The Moon with mild aspect
Ascended on high.

God spake: the waters teem with life,
The tenants of the floods;
The many-colour'd winged birds
Dart quickly thro' the woods.
Chor. High rushes the eagle
On fiery wings,
Low hid in the valley
The nightingale sings.

God spake: the lion, steer, and horse
Spring from the moisten'd clay,
While round the breast of mother earth
Bees hum, and lambkins play.
Chor. They give life to the mountain,
They swarm on the plain,
But their eyes fix'd on earth
Must for ever remain.

God spake: he look'd on earth and heaven
With mild and gracious eye:
In his own image man he made,
And gave him dignity.
Chor. He springs from the dust,
The Lord of the earth,
The chorus of heaven
Exult at his birth.

And now Creation's work was ended,
Man raised his head, he spoke:
The day of rest by God ordained,
The Sabbath morning broke.

LONDON POST-OFFICE.

The ordinary business of each day is, in letters in the inland office alone, 35,000 letters received, and 40,000 sent (23,475,000 annually), exclusive of the numbers in the foreign office department and the ship-letter office, and altogether independent of the two [illegible] post. The number of newspapers daily varies fro[illegible]000 [illegible] 60,000 (on Saturday 40,000, and on Mond[illegible] [illegible] which number about 20,000 are put into the [illegible] 5[illegible] minutes before six o'clock. After that hour each newspaper is charged one halfp[illegible], which yields a revenue of fully £500 a year, and of which 240,000 newspapers are annually put into the office from six to a quarter before eight o'clock. [illegible] derived from charges for [illegible] London is £4,000, and the sum ob[illegible] by the charge of *one penny* on each letter given to the postmen, who go round with bells to collect the letters, is £3,000 a year, giving 720,000, or nearly 2,000 daily. The revenue of London is £6,000 a week, above £300,000 a year; and yet of all this vast annual revenue there has only been lost by defaulters £20[illegible] in twenty-five years. The franks amount in a morning to 4,000 or 5,000, or more. Newspapers can only be franked for foreign parts to the first port at which the mail arrives; after this they are charged postage according to their weight, in consequence of which an English daily paper costs in St. Petersburgh £40 sterling per annum.

THE MAID OF ORLEANS.

The 6th of January is said to be the birth-day of Jeanne d'Arc, commonly called the Maid of Orleans. This extraordinary person, whose exploits form one of the most brilliant adventures in modern history, was the daughter of Jacques d'Arc, a peasant residing in the village of Domremy, then situated on the western border of the territory of Lorraine, but now comprehended within the department of the Meuse, in the north eastern corner of France. Here she was born, according to one account in 1402, according to another in 1412, while other authorities give 1410 as the year. She was one of a family of three sons and two daughters, all of whom were bred to the humble or menial occupations suitable to the condition of their parents. Joan, whose education did not enable her even to write her own name, adopted at first the business of a seamstress and spinster; but after some time she left her father's house and hired herself as servant at an inn in the neighbouring town of Neufchateau. Here she remained for five years. From her childhood she had been a girl of a remarkably ardent and imaginative cast of mind. Possessed of great beauty, and formed, both by her personal attractions and by the gentleness of her disposition and manners, to be the delight of all with whom she associated, she yet took but little interest either in the amusements of those of her own age, or in any of the ordinary occurrences of life. Her first, and for many years the all-absorbing passion was religion. Before she left her native village most of her leisure hours were spent in the recesses of a forest in the neighbourhood. Here she conversed, not only with her own spirit, but in imagination also with the saints and the angels, till the dreams of her excited fancy assumed the distinctness of reality. She believed that she heard with her ears voices from heaven; the archangel Michael, the angel Gabriel, Saint Catherine and Saint Margaret—all seemed at different times to address her audibly. In all this there is nothing inexplicable, or even uncommon. The state of mind described has been in every age a frequent result of devotional enthusiasm.

After some time another strong sentiment came to share her affections with religion—that of patriotism. The state of France, with which Lorraine, though not incorporated, was intimately connected, was at this period deplorable in the extreme. A foreign power, England, claimed the sovereignty of the kingdom, was in actual possession of the greater part of it, and had garrisons established in nearly all the considerable towns. The Duke of Bedford, one of the uncles of Henry VI. the King of England, resided in Paris, and there governed the country as regent in the name of his young nephew. The Duke of Burgundy, the most powerful vassal of the crown, had become the ally and supporter of this foreign domination. Charles VII., the legitimate heir of the throne, and decidedly the object of the national attachment, was a fugitive, confined to a narrow corner of the kingdom, and losing every day some portion of his remaining resources. These events made a great impres-

sion upon Jeanne. The village of Do[illegible], it appears, was almost universally attached to the cause of [illegible]. In her eyes especially it was the cause of Heaven as well as of France. While she lived at Neufchateau she enjoyed better opportunities of learning the progress of public affairs. Martial feelings here began to mix themselves with her religious enthusiasm—a union common and natural in those times, however incongruous it may appear in ours. Her sex, which excluded her from the profession of arms, seemed to her almost a degrading yoke, which it became her to disregard and to throw off. She applied herself accordingly to manly exercises, which at once invigorated her frame, and added a glow of finer animation to her beauty. In particular she acquired the art of managing her horse with the boldness and skill of the most accomplished cavalier.

It was on the 24th of February, 1429, that Jeanne first presented herself before King Charles at Chinon, a town lying a considerable distance below Orleans on the south side of the Loire. She was dressed in male attire, and armed from head to foot; and in this disguise she had travelled in company with a few individuals whom she had persuaded to attend her one hundred and fifty leagues through a country in possession of the enemy. She told his Majesty that she came, commissioned by Heaven, to restore him to the throne of his ancestors. There can be little doubt that Charles himself, or some of his advisers, in the desperate state to which his affairs were reduced, conceived the plan of turning the pretensions of the enthusiast, wild as they might be deemed, to some account. Such a scheme was not nearly so unlikely to suggest itself, or so unpromising, in that age, as it would be in ours;—as the result which followed in the present instance abundantly proves. At this time the town of Orleans, the principal place of strength which still held out for Charles, and which formed the key to the only portion of the kingdom where his sway was acknowledged, was pressed by the besieging forces of the English, and reduced to the most hopeless extremity. Some weeks were spent in various proceedings intended to throw around the enterprise of the Maid such show of divine protection as might give the requisite effect to her appearance. At last, on the 29th of April, mounted on her white steed, and with her standard carried before her, she dashed forward at the head of a convoy with provisions, and in spite of all the opposition of the enemy forced her way into the beleaguered city. This was the beginning of a rapid succession of exploits which assumed the character of miracles. In a few sallies she drove the besiegers from every post. Nothing could stand before her gallantry, and the enthusiasm of those who in following her standard believed that the invincible might of Heaven itself was leading them on. On the 8th of May the enemy, who had encompassed the place since the 12th of the preceding October, raised the siege, and retired in terror and disorder. From this date the English domination in France withered like an uprooted tree. In a few days after followed the battle of Patay, when a great victory was won by the French forces under the command of the Maid over the enemy, conducted by the brave and able Talbot. Two thousand five hundred of the English were left dead on the field, and twelve hundred were taken prisoners, among whom was the General himself. Town after town now opened its gates to the victors, the English garrison retiring in general without a blow. On the 16th of July Rheims surrendered; and the following day Charles was solemnly consecrated and crowned in the cathedral there. Having now, as she said, fulfilled her mission, the Maid of Orleans petitioned her royal master to suffer her to return to the quiet and obscurity of her native village and her former condition. Charles's entreaties and commands unfortunately prevailed upon her to forego this resolution. Honours were now lavishly bestowed upon her. A medal was struck in celebration of her achievements, and letters of nobility were granted to herself and to ces[illegible] member of her family. Many gallant and suc[illegible] these we cannot [illegible] her subsequent history; but lamentable—indelibly disgrace[illegible]. Her end was less so to France. On the 24th of May, [illegible] hardly heroically fighting against the army of the Duke of Burgundy under the walls of Compeigne, she was shamefully shut out from the city which she was defending, through the contrivance of the governor; and being left almost alone, was, after performing prodigies of valour, compelled to surrender to the enemy. John of Luxembourg, into whose hands she fell, some time after sold her for a sum of ten thousand livres to the Duke of Bedford. She was then brought to Rouen, and tried on an accusation of sorcery. The contrivances which were resorted to in order to procure evidence of her guilt exhibit a course of proceedings as cruel and infamous as any recorded in the annals of judicial iniquity; and on the 30th of May, 1431, she was sentenced to be burned at the stake. During all this time no attempt had been made by the ungrateful and worthless prince, whom she had restored to a throne, to effect her liberation. In the midst of her calamities the feminine softness of her nature resumed its sway, and she pleaded hard that she might be allowed to live. But her protestations and entreaties were alike in vain; on the following day the horrid sentence was carried into execution in the market-place of Rouen. The poor unhappy victim died courageously and nobly as she had lived; and the name of her Redeemer was the last sound her lips were heard to utter from amidst the flames.

Thus was perpetrated by the rancour of national animosity another deed as dishonourable to the fair fame of England as the murder of Wallace in the preceding century. How sadly does this act of cruelty, vengeance, and foul injustice tarnish the glory of Cressy, Poitiers, and Agincourt! But the contest in which these great victories were won was from the beginning a work of injustice and folly. As waged between the Kings of England and France, it was, to say the least, commenced and carried on by the former on grounds of very dubious right. Edward III. even acquiesced for several years without a murmur, in the succession of Philip of Valois to the French throne, before he took up arms to endeavour to displace him. But surely such a controversy did not concern merely these two sovereigns as individuals. If there was a doubt as to which was best entitled by descent to the vacant crown, the unquestionable preference of the nation for Philip ought to have been considered at once decisive as to their conflicting pretensions. Regarded in another point of view, these attempts of England to conquer France were still more objectionable and absurd. If they had succeeded, no greater calamity could have befallen this island, which in that case would have been reduced to a mere province of the larger country. But although this catastrophe was fortunately prevented, and, to all appearance, by the instrumentality of the Maid of Orleans, other results of the most disastrous description followed to both nations. The waste of resources occasioned by these wars, the quantity of blood that was shed on both sides, the misery and demoralization that were spread over the fairest portion of Europe, are such as cannot be thought of without horror. Above all, however, and forming perhaps their most serious consequence, because an evil of the longest duration, was the bitter national hatred which they engendered between the inhabitants of two countries placed in the most favourable relation for friendly intercourse, and formed by nature to strive together in the race of civilization, instead of thus to waste their energies for each other's annoyance and destruction. The feelings of rancorous hostility left by these old wars have undoubtedly had a powerful influence down even to our own day in arraying France and England against each

other in the opposite ranks of almost every contest that has since raged in Europe. Let us hope that a wiser and more Christian spirit has now advanced; and that these anti-social and almost ... exhibit them, not as heretofore, their future ... foot to foot and breast to breast in the clash of swords, but moving forward together, and leading, as it were, hand in hand, the march of human improvement.



[Statue of the Maid of Orleans at Rouen.]

Barberini Vase.—We are informed that the Barberini Vase, according to the opinion of Dr. Wollaston, was formed by making an artificial opal, which was then *blown* out as is now done with glass vessels; after which part of the outer layer was cut away, leaving the figures in relief.

Ostrich of South Africa.—A correspondent states, that to the general truth of the account of the ostrich of South Africa, given in the 'Penny Magazine' of December 8, he can bear testimony, having been some years in the interior of the Cape, principally engaged in collecting ostrich feathers. He adds, however, that it is there stated that the fine feathers so much prized, are from the tail of the bird, which is not the fact, although that opinion is very general. The principal white feathers are from the wings; which, in a bird in full plumage, contain forty. The tail feathers seldom exceed nine inches in length, and are of so little value that they are seldom exported from the Cape, as the birds, when killed, are generally found with the tails worn to the stumps, from working in the sand, especially during the season of incubation. That this is the case, persons may satisfy themselves by examining any of the living specimens in the Zoological Gardens, or the preserved specimen in the British Museum.

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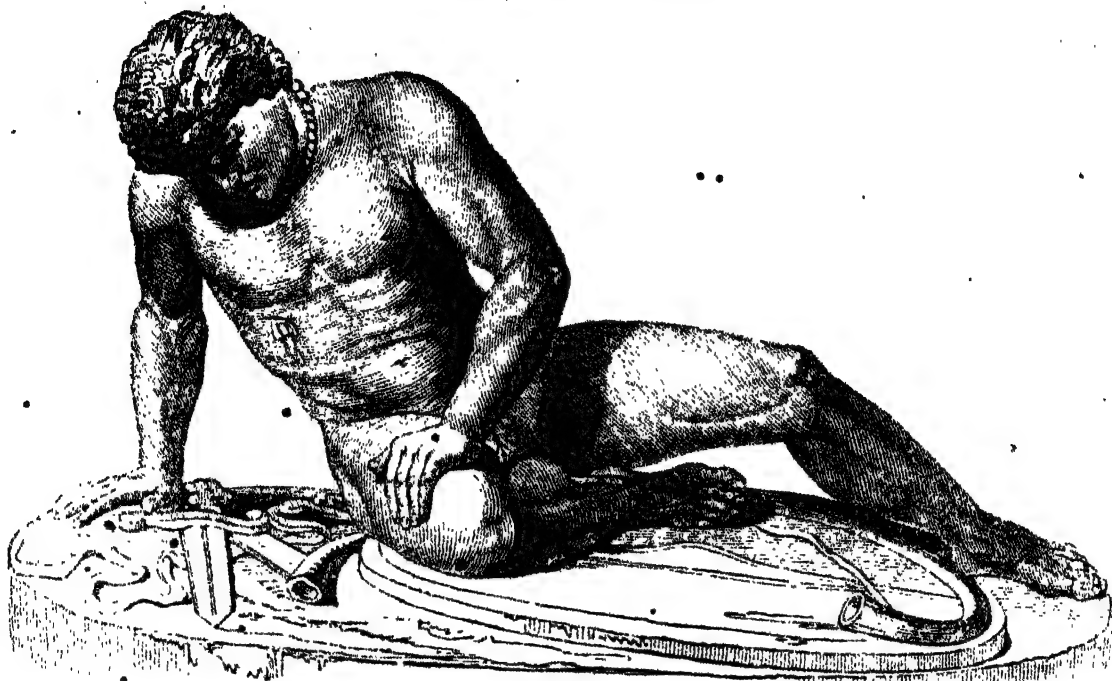
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THE DYING GLADIATOR.



THIS celebrated statue, which is now at Rome, has given rise to much discussion, and it is at least doubtful whether it bears its right name. It is thus described by Winkelmann (vol. ii. p. 241, French ed.):—"It represents a man of toil, who has lived a laborious life, as we may see from the countenance, from one of the [illegible], which is genuine, and from the soles of the feet. He has a cord round his neck, which is knotted under the chin; he is lying on an oval buckler, on which we see a kind of broken horn*." The rest of Winkelmann's remarks are little to the purpose.

Pliny, in a long chapter of his thirty fourth book, wherein he enumerates the most famous statuaries who worked in metal, mentions one called Ctesilaus, who appears to have lived near, or shortly after, the time of Phidias. "He made," says Pliny, "a wounded man expiring (or fainting), and he succeeded in expressing exactly how much vitality still remained." It is possible that this bronze or metal figure may be the original of the marble figure now in Rome, to which we give the name of the Dying Gladiator. As far as we can judge from the attitude, the armour, the general character of the figure, and the deep expression of pain and intense agony, the whole composition may very possibly be intended to represent the death of one of those wretched beings, who were compelled to slaughter each other for the amusement of the Roman capital. The broken horn is, however, considered by some critics as an objection to this statue being a representation of a gladiator; the signal for the combat, they say, might be given with a horn, but what had the fighter to do with one? This seems to us a small objection. The presence of the horn does not necessarily imply that it [illegible] symbol, a kind of short-hand, which brings to recollection the crowded amphitheatre, the eager populace, the devoted victims, the signal for attack; and the sad contrast to all this is exhibited in the figure of the dying man. As to any difficulty that may be raised about the kind of armour, or the cord round the neck, this may be removed by considering that the Romans had gladiators from all countries, and that these men often fought with their native weapons, and after the fashion of their own country. The savage directors of these spectacles knew full well the feelings of animosity with which uncivilized nations are apt to regard one another, and they found no way so ready for exhibiting to the populace all the bloody circumstances of a real battle, as to match together people of different nations.

Whether this figure be that of a dying gladiator or not, it is pretty certain it will long retain the name, at least in the popular opinion in this country, as it has furnished the subject for some of the noblest lines that one of the first of modern poets ever penned:—

"I see before me the gladiator lie
He leans upon his hand—his manly brow
Consents to death, but conquers agony,
And his droop'd head sinks gradually low—
And through his side the last drops, ebbing slow
From the red gash, fall heavy, one by one,
Like the first of a thunder-shower; and now
The arena swims around him—he is gone,
Ere ceased the inhuman shout which hail'd the wretch who won.

"He heard it, but he heeded not—his eyes
Were with his heart, and that was far away;
He reck'd not of the life he lost, nor prize,
But where his rude hut by the Danube lay,
There were his young barbarians all at play,
There was their Dacian mother—he, their sire,
Butcher'd to make a Roman holiday—
All this rush'd with his blood.—Shall he expire,
And unavenged?—Arise, ye Goths, and glut your ire!"

* [illegible] quality, unmixed with those earthy [illegible] dients which must be separated by an expensive process [illegible] and that nec

Had the poet always felt and written in the same strain, he might have claimed the higher rank of one of the first of moralists. What must we think of the state of degradation in which the Roman people were sunk, when the sight of human blood was necessary to gratify their passion for novelty, and to preserve to their rulers a temporary popularity? Cruelty, ferocity, cowardice, and laziness were the vices necessarily cherished by such odious sights; and it is a fact that ought never to be lost sight of by those who wish to improve the character of society, that to be taught to look with indifference on the sufferings of any living object, is the first lesson in cruelty.

With the extension of the Roman empire by conquest, and the increase of private wealth obtained from the plunder of provinces, and by every species of extortion that could be devised, the practice of giving public exhibitions on a splendid scale became one of the duties of a great man, who wished to attain or secure popularity. But under the Emperors the games of the amphitheatre were carried to a pitch of extravagant expenditure, that far surpassed any thing that had been witnessed in the latter days of the Republic. From every part of the then known world, from the forests of Germany, the mountains and deserts of Africa and Asia, was brought, at enormous expense, every animal that could minister to the sports of the arena; and the Roman populace beheld, without knowing how to appreciate, the wondrous camelopard and the two-horned rhinoceros, which half a century ago European naturalists were scarcely able to describe with precision.

The enormous buildings erected to gratify the popular taste, were all surpassed by the huge Colosseum of Vespasian, which has been already described in this Magazine. It was opened by his son Titus, who exhibited at once five thousand wild animals. But the following extract from Tacitus will show that one of Vespasian's predecessors had ventured to try an exhibition, different indeed from any thing that the Colosseum could present, but not inferior in extravagance and cruelty. About fifty miles due east of Rome, in a wide valley enclosed by lofty mountains, lies the broad expanse of the Lake Celano (formerly called Fucinus): its greatest length is about fifteen miles, and its breadth from four to six and eight miles. The Emperor at immense cost had made a tunnel through a mountain, which bordered on the west bank of the lake, and to celebrate the opening of the tunnel with due splendour, he exhibited a naval battle on the waters. "About this time, after the mountain which separated the Fucine* lake from the river Liris had been cut through, a sea-fight was got up on the lake itself for the purpose of attracting a crowd to witness the magnificent work just completed. The Emperor Augustus once made an exhibition of this kind near the banks of the Tiber, by constructing an artificial pond; but his ships were of inferior size, and but few in number. Claudius equipped a hundred triremes and quadriremes, and 19,000 men; he also placed floats or rafts in such a position as to enclose a large part of the lake, so that the combatants might not have any chance of escape. He allowed space enough, however, for the full working of the oars, the skill of the helmsman, the driving of the ships against one another, and other manœuvres usual in a sea-fight. On the rafts were stationed companies and bands of the Prætorian cohorts, with breastworks before them, from which they could manage the engines for discharging missiles. The rest of the lake was occupied by the adverse fleets, whose ships were all provided with decks. The shores of the lake, the hills around it, and the tops of the mountains, were like a vast amphitheatre, crowded with a countless multitude from the neighbouring towns, and some from the capital itself, who were attracted by the novelty of the sight, or [illegible]pliment to the Emperor. The Emperor himself, in a magnificent cloak, and his wife Agrippina, at a short distance from him, dressed in a robe embroidered with gold, presided at the spectacle. The combatants, though criminals condemned to death, fought with all the courage of brave men; after many had been wounded, they were excused from completing the work of destruction on one another. At the close of the games, the passage for the waters was opened; but the incompleteness of the work was soon evident, for the canal, so far from being deep enough to drain the lake to the bottom, did not carry off the waters to half their depth."

* Tacitus, Annals, xii. 56.

The traces of this subterranean canal or tunnel are still visible at one extremity.

MINERAL KINGDOM.—Section 1.

There is perhaps no portion of the earth's surface, of the same extent, which contains so great a variety of those mineral substances which minister to the necessities and comforts of life, as the island of Great Britain; and it would almost seem, from its internal structure, as if Providence had pre-ordained that it should be the seat of an opulent and powerful people, and one of its chief instruments for the civilization and advancement of the human race. That this is no extravagant overstrained expression of national vanity, may, we think, be very easily made apparent, by a few reflections on the vast advantages which the British Empire itself, and, through it, the civilized world have derived, from the circumstance of our possessing an abundance of one particular mineral under the surface of our soil. The almost inexhaustible mines of coal, which are found in so many different parts of our island, have unquestionably been one of the chief sources of our wealth, and of our influence among the other nations of Europe. All our great manufacturing towns,—Birmingham, Leeds, Sheffield, Manchester, Glasgow, Paisley, are not only situated in the immediate vicinity of coal, but never would have existed without it. If we had had no coal we should have lost the greater part of the wealth we derive from our metallic ores, for they could neither have been drawn from the depths where they lie concealed, nor, if found near the surface, could they have been profitably refined. Without coal the steam-engine would probably have remained among the apparatus of the natural philosopher: not only did the fuel supply the means of working the machine, but the demand for artificial power, in order to raise that same fuel from the bowels of the earth, more immediately led to the practical application of the great discovery made by Watt, while repairing the philosophical instrument of Dr. Black. Before the invention of the steam-engine, the power required to move machinery was confined to the impelling force of running water, of wind, of animal and human strength,—all too weak, unsteady, irregular, and costly to admit of the possibility of their extensive application. But the steam-engine gave a giant power to the human race, capable of being applied to every purpose, and in every situation where fuel can be found. Thus manufactures arose, and from the cheapness with which labour could be commanded, and the prodigious increase of work done in the same space of time, their produce was so reduced in price, as to bring luxuries and comforts within the reach of thousands who never tasted them before. New tastes thus excited and increasing consumption multiplied manufacturing establishments, and *their* demands led to great manufactures of machinery; competition led to improvement in the steam-engine itself, and thus, by the reciprocal action of improvement and demand, our machinery and manufactures gradually acquired that high degree of perfect[illegible]

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already, in a few years, produced such extraordinary results; and which, when combined with its farther application to wheel carriages, must at no great distance of time occasion a revolution in the whole state of society. At this moment a steam-vessel is exploring lands in the interior of Africa, never before visited by civilized man; the harbinger, we may confidently hope, of future civilization, prosperity and happiness to that vast portion of the earth's surface. Are we not then fully justified in saying that these great results, involving the future destinies of the human race, may be traced to the discovery of the beds of coal placed by nature in our little island?

Next to coal our IRON is the most important of our mineral treasures; and it is a remarkable circumstance, that the ore of that metal, which is so essential to the wants of man that civilization has never been known to exist without it, should in Great Britain be placed in greatest abundance, not only in the vicinity of, but actually associated with the coal necessary to separate the metal from the impurities of the ore, so as to render it fit for our use. In Sweden, and most other countries where iron mines exist, the ore is refined by means of wood, but no space on the surface of our island could have been spared to grow timber for such a purpose: and thus, without coal, in place of being, as we are now, great exporters of wrought and unwrought iron to distant nations, we must have depended on other countries for this metal; to the vast detriment of many of our manufactures, which mainly owe their improvement and extension to the abundance and consequent cheapness of iron.

There are extensive mines of LEAD in Derbyshire, Yorkshire, Northumberland, Lanarkshire, Dumfriesshire, and several other places in Great Britain, sufficient not only for the internal demand for that metal, but yielding a considerable amount for exportation. COPPER is produced in large quantities in Cornwall, and the same county has been celebrated for its TIN mines for nearly two thousand years.

Coal, iron, lead, copper, and tin, are the principal minerals of our country, which, in common language, are usually associated with the idea of the produce of mines. Silver and gold we have none, with the exception of a little of the former contained in some of the ores of lead, and which is separated by refining, when in sufficient quantity to yield a profit beyond the expense of the process; but we have some other metals, highly useful in the arts, such as zinc, antimony, and manganese.

Besides the substances above mentioned, we have many other mineral treasures of great importance still to be noticed. Of these the most valuable perhaps is limestone, from its use in agriculture, to ameliorate and increase the fertility of the soil, and from its being an indispensable ingredient in mortar for building; and there are not many parts of the island far distant from a supply of this material. Building stone is found in most parts of the country; and although we must go to Italy for the material for the art of sculpture to be employed upon, we have freestones applicable to all the purposes of ornamental architecture, and we have many marbles of great beauty. If stones be far off, clay is never wanting to supply a substitute; and the most distant nations have their daily food served up in vessels, the materials of which, dug from our clay-pits, have given occupation to thousands of our industrious population in our potteries and china manufactures. For our supply of SALT, that essential part of the daily sustenance of almost every human being, we are not dependent on the brine which encircles our island, for we have in the mines and salt springs of Cheshire and Worcestershire almost inexhaustible stores of the purest quality, unmixed with those earthy and other ingredients which must be separated by an expensive process, before a culinary salt can be obtained from the water of the sea.

Familiar as are almost every one of the mineral substances we have named, in the common business of life, there are many persons who have but a very imperfect idea from whence they are derived, and what previous processes they undergo before they can be made applicable to our use. We do not doubt, therefore, that we shall contribute to the instruction and entertainment of many of our readers, by devoting a portion of our Magazine to a series of articles, in which we propose to make them acquainted with the natural history of our mineral treasures, with the mode in which they are obtained from the mines, and with the operations they are subjected to, before they can be brought forward as marketable commodities. To do this, however, in a clear and intelligible manner, some preliminary information is indispensable; without this, the terms we must necessarily employ, in our descriptions of the mode in which the substances exist under the surface of the earth, would not be understood. This introductory matter, however, we are persuaded will not be found the least instructive or the least entertaining part of the information we shall lay before our readers; on the contrary, we feel assured that it will disclose to many of them wonders of nature, of which they had previously no conception. It will embrace a popular sketch of the leading doctrines in GEOLOGY, that department of science, whose object is to investigate the nature and properties of the substances of which the solid crust of the earth is composed; the laws of their combinations, as constituting the elements of rocks, and other stony masses; the arrangement of these different masses, and their relations to each other, the changes which they appear to have undergone at various successive periods; and, finally, to establish a just theory of the construction of that solid crust. In the formation of organized bodies, that is, in the structure of animals and plants, the most superficial observer cannot fail to discover a beautiful and refined mechanism; but if we cast our eyes upon the ground, and look at heaps of gravel, sand, clay, and stone, it seems as if chance only had brought them together, and that neither symmetry nor order can be discovered in their nature. But a closer examination soon convinces us of that which, reasoning from the wisdom and designs manifested by other parts of creation, we might beforehand have very naturally been led to expect, viz. that in all the varieties of form, and structure, and change, which the study of the mineral kingdom displays, laws as fixed and immutable prevail, as in the most complicated mechanism of the human frame, or in the motions of the heavenly bodies; and if astronomy has discovered how beautifully "the heavens declare the glory of God," as certainly do we feel assured, by the investigations of geology, that the earth "showeth his handy work."

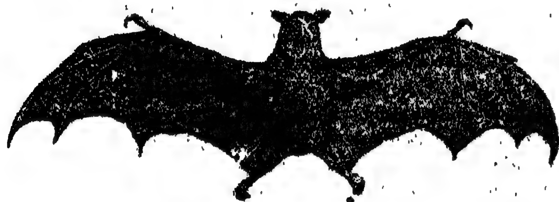
In our next article, therefore, we shall commence that brief outline of geology, which we consider to be a necessary introduction to our proposed description of the chief mineral productions of our island.

FLYING.

THE act of flying is performed in the following manner:—The bird first launches itself in the air either by dropping from a height or leaping from the ground: it raises up at the same time the wings, the bones of which correspond very closely to those of the human arm, the place of the hand, however, being occupied by only one finger. It then spreads out the wings to their full extent in a horizontal direction, and presses them down upon the air; and by a succession of these strokes the bird rises up in the air with a velocity proportional to the quickness with which they succeed each other. As the inter-

vals between the strokes are more and more lengthened, the bird either remains on the same level or descends. This vertical movement can only be performed by birds whose wings are horizontal, which is probably the case with the lark and quail. When birds fly horizontally, their motion is not in a straight line, but obliquely upwards, and they allow the body to come down to a lower level before a second stroke is made by the wings, so that they move in a succession of curves. To ascend obliquely the wings must repeat their strokes upon the air in quick succession, and in descending obliquely these actions are proportionally slower. The tail in its expanded state supports the hind part of the body: when it is depressed while the bird is flying with great velocity, it retards the motion; and by raising the hinder part of the body, it depresses the head. When the tail is turned up it produces a contrary effect, and raises the head. Some birds employ the tail to direct their course, by turning it to one side or the other in the same manner as a helm is used in steering a ship. We may observe that there is a peculiarity in the bones of birds which serves to lighten their bodies and greatly to facilitate their motions. A considerable portion of the skeleton is formed into receptacles for air, the interior of most bones in adult birds being destitute of marrow, and containing air-cells which communicate with the windpipe or the mouth. In young birds the interior of the bone is filled with marrow, which, however, becomes gradually absorbed to make room for the admission of air. This gradual expansion of the air-cells, and absorption of the marrow, can no where be observed so well as in young tame geese when killed at different periods.

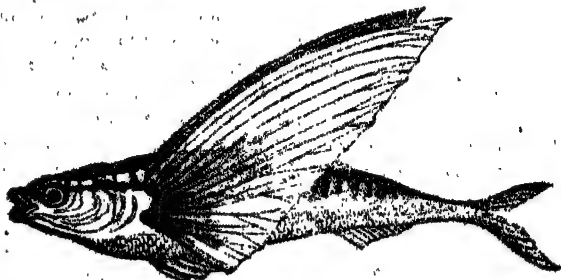
Flying is not confined to those inhabitants of the air which have wings composed of feathers; there are many of these whose bodies are so light as not to require wings made of such strong materials, and which have them composed of thin membranes of the slightest texture. This is the case with all flying insects. The *Bat*, which belongs to the class Mammalia, is supplied with a kind of wing peculiar to itself which may be considered as an intermediate link between the wings of birds and those of other animals.



The bat's wings are formed of membranes spread upon the bones which correspond to those of the arm, fore-arm, and hand in man, and of the fore-leg in quadrupeds. So far they resemble those of birds; they differ, however, in the materials of which they are composed, and in the bones bearing a closer resemblance to those of the human hand. They have what is peculiar to themselves—a hook-like process attached to the bone of the wing, by which they lay hold and support themselves upon the cornices of buildings, and so far employ their wings as hands. These wings when extended are of great length. In the larger species found in some parts of India, Africa, and South America, celebrated under the name of Vampyres, they often measure five feet; and Sir Hans Sloane was in possession of a specimen brought from Sumatra, the wings of which measured seven feet. As the bat itself is not rendered buoyant by any of the means employed in the internal structure of birds, and as its wings are themselves membranes of some strength, great extent of surface is required in them; they are not, however, fitted for long flight, and must be considered as a very remarkable deviation from the structure of the bird on one part, and from that of the quadruped on the other. The only regularly formed quadruped that has the power of flying is the *Flying Squirrel*. The substi-



tute for wings in this animal is a broad fold of the integument spread out on each side of the body, and attached to the fore and hind legs, reaching as far as the feet; so that by stretching out its feet it spreads this fold and keeps it in an extended state, in which it has a nearer resemblance to a parachute than a wing. Some species of lizards and fishes are also furnished with substitutes for wings, by which they are enabled to support themselves in the air, and fly for short distances. In the *Flying Fish* the substitute consists of a simple elongation



of the pectoral fins to a sufficient extent to support the animal's weight, in this respect corresponding with the wings of birds, since the pectoral fin of fishes is analogous to the anterior extremity of the other classes.

THE URSINE BABOON.

[From a Correspondent.]



"With shattered rocks loose sprinkled o'er,
Ascends abrupt the mountain hoar,
Whose crags o'erhang the Bushman's cave,
(His fortress once, and now his grave,)
Where the grim satyr-faced baboon
Sits railing to the rising moon,
Or chiding, with hoarse angry cry,
The herdsman as he wanders by."

THE Ursine Baboon of South Africa (*Cercopithecus Ursinus*, or *Simia Cynocephalus*) is known to naturalists from the descriptions of Sparrman, Vaillant, Burchel, and other scientific travellers. It is an animal of very

considerable strength, and attains, when full grown, the size of a very large Newfoundland dog. It resembles the dog in the shape of its head, and is covered with shaggy hair of a brownish colour, except on the face and paws, which are bare and black. On level ground it always goes on all-fours; but among the rocks and precipices, which are its natural refuge and habitation, it uses its hinder feet and hands somewhat as a human being would do, only with inconceivably greater boldness and agility, in clambering up the crags, or in springing from cliff to cliff.

The ursine baboon is not believed to be in any degree carnivorous, but subsists on wild fruits, and principally on the numerous variety of *uintjes* (edible roots and bulbs), which abound in the districts it inhabits. These roots it digs out of the earth with its paws, the nails of which, from this cause, are generally short, as if worn down by constant use; in other respects they nearly resemble those of the human hand.

For defence against its enemies, such as the leopard, hyæna, wild-dog (*hyæna venatica*), &c. the ursine baboon is armed with formidable canine teeth about half an inch long; and, when driven to extremity, will defend itself successfully against the fiercest wolf-hound. It has a mode of grappling its antagonist by the throat with its fore-paws, or *hands*, while it tears open the jugular vein with its tusks. In this manner I have known a stout baboon despatch several dogs before he was overpowered; and I have been assured by the natives that even the leopard is sometimes defeated and worried to death by a troop of these animals. It is only collectively, however, and in large bands, that they can successfully oppose this powerful enemy. In many of the mountainous districts the leopard, it is said, subsists chiefly by preying upon baboons and monkeys; lying in wait and pouncing upon them suddenly, precisely as the domestic cat deals with rats.

Though well armed for conflict, the ursine baboon, except in self-defence, appears to be a harmless and inoffensive animal. They are, it is true, occasionally troublesome to mankind, by robbing gardens, orchards, and corn-fields; but I never heard of any body being attacked by them, although I resided for some years in a spot where they are so numerous that the district takes its name from them, viz. *Baviaans River*, or River of Baboons. There is, indeed, one remarkable story told at the Cape of a party of these animals carrying off an infant from the vicinity of Wynberg, a village about seven miles from Cape Town, and, on the alarm being given by the distracted mother, retreating with it to the summit of the precipitous mountains 3000 feet in height, which overhang that pleasant village. My informants, persons of respectability, assured me that this incident had occurred within their own recollection; and that the child was recovered by a party of the inhabitants, after a long, anxious, and perilous pursuit, without having sustained any material injury. This singular abduction, the only instance of the kind I ever heard of, may, after all, have been prompted possibly by the erratic maternal feeling of some female baboon, bereaved of her own offspring, rather than by any ferocious or mischievous propensity.

Be this as it may, the strong attachment of these creatures to their own young is an interesting trait of their character. I have frequently witnessed very affecting instances of their attachment, when a band of them happened to be discovered by some of the African Colonists in their orchards or corn-fields. On such occasions, when hunted back to the mountains with dogs and guns, the females, if accidentally separated from their young ones, would often, reckless of their safety, return in search for them through the very midst of their fierce pursuers.

On more peaceful occasions, also, I have very often contemplated them with great pleasure and interest. It is the practice of these animals to descend from their rocky fastnesses, in order to enjoy themselves on the banks of the mountain rivulets, and to feed on the nutritious bulbs which grow in the rich alluvial soil of the valleys. While thus occupied, they usually take care to be within reach of some steep crag or precipice, to which they may fly for refuge on the appearance of an enemy; and some of their number are always stationed as sentinels on large stones or other elevated situations, in order to give timely warning to the rest of the approach of danger. It has frequently been my lot, when riding through these secluded valleys, to come suddenly, on turning the corner of a rock, upon a troop of forty or fifty baboons thus quietly congregated. Instantly on my appearance, a loud cry of alarm would be raised by the sentinels; and then the whole band would scamper off with the utmost precipitation. Off they would go, hobbling on all-fours, after their awkward fashion, on level ground; then splashing through the stream, if they had it to cross; then scrambling, with most marvellous agility up the rocky cliffs, often many hundred feet in height, and where certainly no other creature without wings could possibly follow them; the large males bringing up the rear-guard, ready to turn with fury upon my hounds if they attempted to molest them; the females, with their young ones in their arms, or clinging to their backs. Thus, climbing, and chattering, and squalling, they would ascend the perpendicular and perilous-looking crags, while I looked on, and watched them, interested by the almost human affection which they evinced for their mates and their offspring; and sometimes not a little amused, also, by the angry vociferation with which the old satyr-like leaders would scold me, when they had got fairly upon the rocks, and felt themselves secure from pursuit. T. P.

THE JACQUARD LOOM.

The history of manufactures affords few parallels to the rapid and marked improvements made in the art of silk-weaving in this country during the last six years.

The invention by which these improvements have been principally accomplished is a loom contrived by M. Jacquard, and which, bearing his name, will probably prove a lasting record of his mechanical talents.

Scarcely ten years have elapsed since the first introduction of the machine into this country, yet its superiority over the looms formerly used for figure silk-weaving is so decided, that it has entirely superseded all these, and has been in no small degree instrumental in bringing that curious and beautiful art to its present state of advancement. Through its means time is importantly economised in the preliminary steps, while the most difficult part of the labour is so simplified that this branch of silk-weaving is no longer, as heretofore, confined to the most skilful of the craft. It is no small proof of the enterprising and intelligent spirit of this country that several alterations, by which this machine has been materially simplified and improved, have been already made by our working artisans, and are in advantageous operation; "while in Lyons, the city of its birth, it still remains unaltered, either in form or arrangement, from the original conception of the first ingenious inventor*."

From the evidence given by Dr. Bowring before the Committee of the House of Commons appointed to inquire into the state of the Silk Trade, we obtain the following interesting particulars of M. Jacquard as related to Dr. Bowring by himself:—

He was originally a manufacturer of straw-hats, and it was not until the peace of Amiens that his attention was first attracted to the subject of mechanism. The communication between France and England being then open, an English newspaper fell into his hands. In this he met with a paragraph stating that a premium

* Lardner's Cabinet Cyclopædia, Silk Manufacture, p. 256.

would be awarded by a society in this country to any person who should weave a net by machinery. The perusal of this extract awakened his latent mechanical powers, and induced him to turn his thoughts to the discovery of the required contrivance. He succeeded, and produced a net woven by machinery of his own invention. It seems, however, that the pleasure of success was the only reward which he coveted, for as soon as accomplished he became indifferent to the work of his ingenuity—threw it aside for some time, and subsequently gave it to a friend as a matter in which he no longer took any interest. The net was by some means at length exhibited to some persons in authority, and by them sent to Paris. After a period had elapsed in which M. Jacquard declares that he had entirely forgotten his production, he was sent for by the prefect of Lyons, who asked him if he had not directed his attention to the making of nets by machinery. He did not immediately recollect the circumstance to which the prefect alluded, the net was however produced, and this recalled the fact to his mind. The prefect then rather peremptorily desired him to produce the machine by which this result had been effected. M. Jacquard asked three weeks for its completion; at the end of which time he brought his invention to the prefect, and directing him to strike some part of the machine with his foot, a knot was added to the net. The ingenious contrivance was sent to Paris, and an order was thence despatched for the arrest of the inventor. Under Napoleon's arbitrary government even the desire for the diffusion of improvements was evinced in a most unconciliatory manner; and while inventions in the useful arts were sufficiently prized, no respect was paid to those persons by whom they were originated. Accordingly M. Jacquard found himself under the keeping of a gens-d'arme, by whom he was to be conducted to Paris in all haste, so that he was not permitted even to go home to provide himself with the requisites for his sudden journey. When arrived in Paris he was required to produce his machine at the Conservatory of Arts, and submit it to the examination of inspectors. After this ordeal he was introduced to Bonaparte and to Carnot, the latter of whom said to him, with a look of incredulity, "Are you the man who pretends to this impossibility—who professes to tie a knot in a stretched string?" In answer to this inquiry the machine was produced and its operation exhibited and explained. Thus strangely was M. Jacquard's first mechanical experiment brought into notice and patronised. He was afterwards required to examine a loom on which from twenty to thirty thousand francs had been expended, and which was employed in the production of articles for the use of Bonaparte. M. Jacquard offered to effect the same object by a simple machine, instead of the complicated one by which the work was sought to be performed,—and improving on a model of Vaucanson, produced the mechanism which bears his name. A pension of a thousand crowns was granted to him by the government as a reward for his discoveries, and he returned to Lyons, his native town. So violent, however, was the opposition made to the introduction of his loom, and so great was the enmity he excited in consequence of his invention, that three times he with the greatest difficulty escaped with his life. The *Conseil des Prud' hommes*, who are appointed to watch over the interests of the Lyonese trade, broke up his machine in the public *place*; "the iron (to use his own expression) was sold for iron—the wood for wood, and he, its inventor, was delivered over to universal ignominy." The ignorance and prejudice which caused the silk-weavers of Lyons to destroy a means of assistance to their labours, capable of being made a source of great [illegible] to themselves, was not dispelled till the French [illegible] feel the effects of foreign competition in their manufacture. They then were forced to adopt the [illegible] loom, which led to such great improvement in silk weaving, and this machine is now extensively employed through the whole of the silk manufacturing districts of France as well as of England.

ON THE CURE OF BURNS BY COTTON WOOL.

BURNS and scalds are probably the most common injuries to which the people of England are exposed. In our mines and manufactories they are constantly occurring. Even in ordinary life we hear almost daily of such accidents. It often happens that females, by standing incautiously too near a grate, set fire to their cotton dresses, and the flames spreading rapidly along the soft texture of the cotton, soon envelope the whole of their persons. Reading in bed by candle-light is a frequent source of similar disasters. Servants again, while engaged in the removal of boiling water for domestic purposes, are often, through carelessness or accident, the subjects of scalds.

Burns and scalds are exactly of the same nature. It is the intolerable *heat* of the liquid or of the solid substance inflicting the injury; which is the cause of both. In looking, therefore, for the means of cure, we should try to discover some remedial agent which will favour, in the highest degree, the restoration to a healthy state of those parts of the body that have been impaired or destroyed by the action of heat.

The plans of treatment which have been introduced from time to time are various; but they may be included under two heads,—namely, those of a *soothing* and those of a *stimulating* character. Of the stimulating class are spirits of turpentine, spirits of wine, whisky, brandy, &c., with any of which the burned parts are kept moist until immediate pain is subdued, and the process of restoration is begun. After these changes have taken place, ointments or poultices are usually had recourse to. Heat has been also tried as a stimulating remedy for burns; and, however singular it may seem, many persons hold the parts burned near to a fire in order to remove the effects of heat. The soothing class of remedies includes the application of cold water, of ice, of oils, and *cotton wool*.

Cotton wool bids fair to supersede many of the common remedies in the treatment of burns. It is said that cotton wool was first used with this intention in America. There is nothing improbable in this, for the practice is of recent origin, and cotton is both grown and manufactured in that country. The discovery of its sanative virtues has been attributed to accident. As the story goes,—the child of a woman who was engaged in the preparation of cotton, happened, in some way or other, to get itself extensively burned with boiling water. The mother, in her agony, having no person with her at the time, laid the child down in some cotton on the floor, which promised to be the safest and softest position, and hastened away to procure medical assistance. The medical man of the village, however, was from home. The poor woman, on her return, found that the child had rolled about in the cotton and had become covered in the burned parts with a thick coating of it. The cotton appeared to have produced great relief of pain; the child had now ceased to cry and was actually cheerful. Some hours elapsed before the medical attendant arrived, but as the child continued cheerful and the cotton had become pretty firmly adherent to the sores, the mother would not allow of its being removed. Within the period of ten or twelve days the cotton began to drop off spontaneously; and in a fortnight from the receipt of the injury, the whole of it was detached, leaving a perfect cure,—the skin being without mark or contraction, and, in short, quite natural.

The cotton treatment has since had a pretty extensive trial in different parts of England and Scotland. As might have been expected, scientific observation has enabled medical men to point out the way in which the cotton may be most advantageously applied, and it has also enabled them to define the limits of its utility.

In relation to their degrees of severity, burns may be divided into *four* kinds,—1st, When the injury is of the slightest nature, the skin remains of its natural colour and without blisters. 2d, When the injury is somewhat greater, the superficial skin becomes elevated, and blisters are formed. 3d, When the injury is still more severe, the deep-seated skin is burned brown and dry, and it feels like leather. 4th, When the injury is of the most violent kind, not only the deep-seated skin is scorched, but the parts beneath it, to a greater or less extent, are burned to dryness and are consequently dead. The cotton treatment is little applicable to burns coming under the fourth division, we shall therefore, in this place, speak only of its application to those of the 1st, 2d, and 3d kinds, and more particularly to the 2d and 3d. We must impress upon our readers here, as we are anxious to do in all other cases of medical treatment, that the safest plan, wherever practicable, is to apply for professional aid. The difficulty which an unprofessional person must always feel, is that of distinguishing between one class of injuries or diseases, and another class. However, as burns and scalds require immediate attention, we proceed to state the mode in which cotton may be employed, when no medical man is at hand.

The cotton should be applied to the burned parts as soon after the injury as is possible; and, if blisters have formed, they should not be opened. Where it can be done without incurring considerable delay, the cotton should be carded before its application into thin flakes. These flakes should be laid on the injured part, and piled one on the other until they form a soft covering, which, under high pressure, should be about an inch in thickness. A bandage should then be passed around the patient to prevent the cotton from falling off, but care must be taken not to draw the bandage tight or allow it to press the body. Its object is simply to retain the cotton in its place.

After this, the first step, is taken, nothing remains to be done while the cotton is observed to *stick* to the surface of the injured part and to remain *dry*. Should any portion of the cotton, however, become *wet*, either through the discharge of water from the blisters, or the formation of purulent matter, and continue wet for a day or two, the attendant should, at the end of that time, pick the wetted cotton gently away, and supply its place with dry cotton. The general rule, consequently, is very plain. While the patient is free from pain, and the cotton dry and adherent to the surface of the burn, no change should be made; but should the cotton become wet at any part, and continue so for a day or two, the wetted portion is to be removed, and its place supplied with dry cotton. The treatment is to be conducted thus until the cure is completed.

The manner in which cotton acts in the cure of burns is very evident. It excludes the air and forms a warm and soft covering for the injured parts. Under this protection, the restorative powers of nature quickly repair the injury. Every day's experience tends to prove that the less we interfere with those powers, or permit them to be interfered with, in the medical treatment of superficial burns occurring amongst persons of healthy constitutions, the more successful will be the practice.

THE BATTLE OF CORUNNA.

The 16th of January is the anniversary of the battle of Corunna, and the death of the gallant Sir John Moore. The French invasion of Spain and Portugal in the beginning of the year 1808 was one of the most unprovoked and indefensible aggressions ever perpetrated. The scheme for the conquest and partition of the latter kingdom is supposed to have been arranged in October, 1807, between Bonaparte and Godoy, called the Prince of the Peace, the infamous minion [illegible] Queen and her imbecile and degraded husband Charles IV. In March, 1808, the national spirit of the Spaniards, fired at the weakness with which their Sovereign was surrendering the independence of the country into the hands of the French Emperor, broke out at Aranjuez and Madrid into tumultuous insurrection, and compelled Charles to abdicate in favour of his eldest son, Ferdinand, Prince of Asturias. Soon after this, however, Bonaparte contrived to inveigle both Ferdinand and his father to Bayonne in France, where he induced them in the beginning of May to surrender all their claims upon the Spanish crown in favour of himself or his nominee; and then, having shut up his prisoners, with the other branches of the royal family whom he had contrived to get into his hands, in an old castle in Champagne, he caused his brother Joseph, then King of Naples, to be proclaimed on the 24th of July the successor to the vacant throne. In exchange he sent his brother-in-law Murat to the Neapolitans. Before this, however, the indignation of the people of Spain had organized a formidable resistance to the foreign usurper; patriotic associations had been formed in many of the principal towns, which were under the direction of a presiding junta at Seville; and deputies had been despatched from Asturia to request the assistance of England, where they arrived on the 6th of June. The required aid was rendered by this country liberally, and as it were by acclamation: on the 12th of July Sir Arthur Wellesley set sail from Cork in command of a large force; on the 21st of August he beat the French General Junot at Vimiera, and on the 30th of the same month, by what was called the Convention of Cintra, the French troops agreed to evacuate Portugal. The next expedition despatched to the Peninsula was that commanded by Sir John Moore. This officer, who was the eldest son of Dr. John Moore, the well-known author of 'Zeluco,' and other able works, was born at Glasgow on the 13th of November, 1761, and had served with distinction in various quarters of the globe. He was appointed Commander-in-Chief of the Forces in Spain and Portugal on the 6th of October. Soon after this he commenced his advance into the interior of the Peninsula, in which he persevered till he reached Salamanca. The force, however, which he had under his command was utterly insufficient to cope with the gigantic armament which Bonaparte had by this time collected to maintain his brother's throne. According to Colonel Napier, Moore had only 24,000 men to oppose 330,000 of the enemy. In these circumstances nothing could be done by the English without the most general and most zealous co-operation on the part of the natives. This co-operation, or any cordial disposition to afford it, Sir John Moore could not perceive to exist; and it must be confessed that his situation was extremely difficult, embarrassing, and discouraging. Meantime, while he was deliberating as to the prudence of continuing his advance, intelligence reached him of an important advantage gained by the enemy. This at once determined him to commence his retreat to the coast, as his only chance of preserving his troops. Accordingly, on the 26th of December, he began his route towards Vigo, in the north-west corner of Spain, but was soon after induced to alter his course for the port of Corunna, still farther to the north. This march of two hundred and fifty miles, over a country almost without roads, in the depth of winter, with an army dispirited and disorganized, and pursued by superior numbers flushed with recent triumph, must ever rank with the ablest military achievements of ancient or modern times. It was effected amidst terrible privation, suffering, and loss of life; but at length, on the 16th of January, 1809, about 14,500 of the troops reached the neighbourhood of the place of embarkation. Marshal Soult, however, with a body of not less than 20,000 men under his command, was close upon them, and ready to [illegible] them before they could complete

their preparations for going on board the ships. It was resolved, therefore, to offer battle to the enemy. The French made the attack about two o'clock in the afternoon, and for a time had the advantage; but Moore then ordered an advance of a part of his troops, who soon turned the tide of the contest. The French were repulsed at every point; and the English were allowed to embark without molestation. But the life of their gallant commander paid for the victory. "Sir John Moore," says Colonel Napier, "while earnestly watching the result of the fight about the village of Elvina, was struck on the left breast by a cannon shot; the shock threw him from his horse with violence; he rose again in a sitting posture; his countenance unchanged, and his steadfast eye still fixed upon the regiments engaged in his front; no sigh betrayed a sensation of pain; but, in a few moments, when he was satisfied that the troops were gaining ground, his countenance brightened, and he suffered himself to be taken to the rear. Then was seen the dreadful nature of his hurt; the shoulder was shattered to pieces, the arm was hanging by a piece of skin, the ribs over the heart broken and bared of flesh, and the muscles of the breast torn into long strips, which were interlaced by their recoil from the dragging of the shot. As the soldiers placed him in a blanket his sword got entangled, and the hilt entered the wound. Captain Hardinge, a staff officer, who was near, attempted to take it off, but the dying man stopped him, saying, 'It is as well as it is. I had rather it should go out of the field with me.' And in that manner, so becoming a soldier, Moore was borne from the fight. * * * The blood flowed fast, and the torture of his wound increased; but such was the unshaken firmness of his mind, that those about him, judging from the resolution of his countenance that his hurt was not mortal, expressed a hope of his recovery. Hearing this, he looked steadfastly at the injury for a moment, and then said, 'No; I feel that to be impossible.' Several times he caused his attendants to stop and turn him round, that he might behold the field of battle; and when the firing indicated the advance of the British, he discovered his satisfaction, and permitted the bearers to proceed. Being brought to his lodgings the surgeons examined his wound, but there was no hope; the pain increased, and he spoke with great difficulty. At intervals he asked if the French were beaten, and, addressing his old friend Colonel Anderson, he said, 'You know that I always wished to die this way.' Again he asked if the enemy were defeated, and being told they were, observed, 'It is a great satisfaction to me to know we have beaten the French.' His countenance continued firm, and his thoughts clear; once only, when he spoke of his mother, he became agitated. He inquired after the safety of his friends and the officers of his staff; and he did not even in this moment forget to recommend those whose merit had given them claims to promotion. His strength was failing fast, and life was just extinct, when, with an unsubdued spirit, as if anticipating the baseness of his posthumous calumniators, he exclaimed, 'I hope the people of England will be satisfied. I hope my country will do me justice.' The battle was scarcely ended when his corpse, wrapped in a military cloak, was interred by the officers of his staff in the citadel of Corunna. The guns of the enemy paid his funeral honours, and Soult, with a noble feeling of respect for his valour, raised a monument to his memory."

The death of Sir John Moore has furnished the subject of a poem of extraordinary beauty, the author of which was long unknown. It is now ascertained to be the production of one whose compositions were few, and who died young—Wolfe.

"Not a drum was heard, not a funeral-note,
  As his corse to the rampart we hurried;
Not a soldier discharged his farewell-shot
  O'er the grave where our hero we buried.

We buried him darkly at dead of night,
  The sods with our bayonets turning,
By the struggling moonbeam's misty light,
  And the lantern dimly burning.

No useless coffin enclosed his breast,
  Not in sheet or in shroud we wound him;
But he lay like a warrior taking his rest,
  With his martial cloak around him.

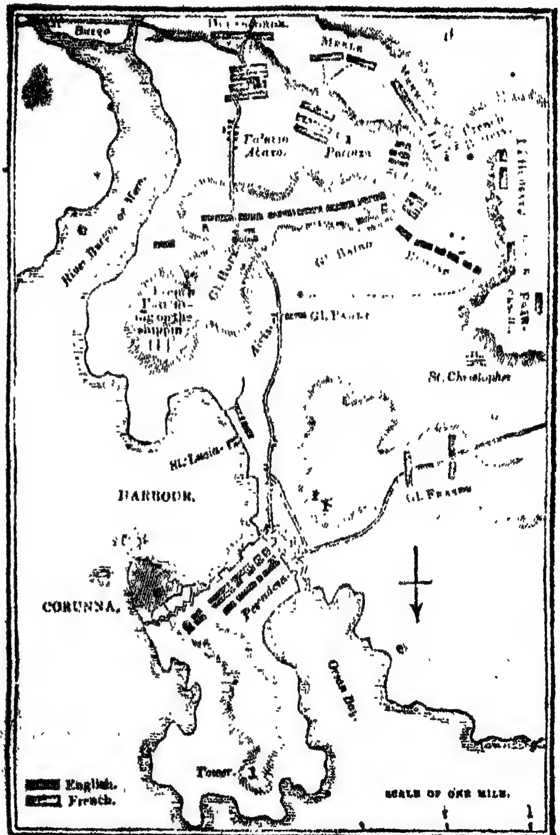
Few and short were the prayers we said,
  And we spoke not a word of sorrow;
But we steadfastly gazed on the face that was dead,
  And we bitterly thought of the morrow.

We thought, as we hollow'd his narrow bed,
  And smooth'd down his lonely pillow,
That the foe and the stranger would tread o'er his head,
  And we far away on the billow!

Lightly they'll talk of the spirit that's gone,
  And o'er his cold ashes upbraid him,—
But little he'll reck, if they let him sleep on
  In the grave where a Briton has laid him.

But half of our heavy task was done,
  When the clock struck the hour for retiring;
And we heard the distant and random gun
  That the foe was sullenly firing.

Slowly and sadly we laid him down,
  From the field of his fame fresh and gory;
We carved not a line, and we raised not a stone—
  But we left him alone with his glory!"



[Plan of the Battle of Corunna.]

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THE CARTOONS.—No. 2.



[PAUL PREACHING AT ATHENS.]

PAUL PREACHING AT ATHENS.

ONE of the leading excellences of Raffaelle is the clear and perspicuous arrangement of his subject. Even Michael Angelo, notwithstanding his astonishing power in the invention of single groups, is comparatively deficient in the conduct of a whole composition; and this remark will apply more or less to all the masters of the Roman school, if put in competition with Raffaelle. The Venetian painters, with the exception of Titian, sacrificed, without scruple, sentiment, propriety, and character, for the sake of dazzling the eye. We are enabled by this species of comparison to appreciate more fully the excellence of Raffaelle, whose compositions, although he never sacrifices the higher to the more superficial qualities of art, present us with the richest and most picturesque combinations. A fine example of this excellence is furnished in the Cartoon of Paul preaching at Athens, engraved in the present number. This work, regarded merely as a composition of lines, and without adverting to the sentiment of it, is a finished example of laborious and beautiful arrangement; but when we consider it in reference to character, expression, and the manner in which the story is told, we are almost tempted to think that it holds the first place even among the productions of Raffaelle himself.

St. Paul, having been challenged by the philosophers of Athens to a public declaration of his doctrines in the Areopagus, has ascended the steps of a temple, where with uplifted hands he makes the solemn announcement, Ye men of Athens! I have seen in your city an altar to the Unknown God, Him I declare unto you!" His discourse involves in its general tenor all the leading points of the Christian dispensation,—the immortality of the soul, the resurrection, and the redemption. The effect produced on his auditory is such as might be anticipated from the promulgation of a doctrine so new and so important. The persons who surround him are not to be considered a mere promiscuous assemblage of individuals. Among them, several figures may each be said to personify a class; and the different sects of Grecian philosophy may be easily distinguished. Here the Cynic, revolving deeply, and fabricating objections; there the Stoic, leaning on his staff, giving a steady but scornful attention, and fixed in obstinate incredulity; there the disciples of Plato, not conceding a full belief, but pleased at least with the beauty of the doctrine, and listening with gratified attention. Farther on is a promiscuous group of disputants, sophists, and free-thinkers, engaged in vehement discussion, but apparently more bent on exhibiting their own ingenuity than anxious to elicit truth or acknowledge conviction. At a considerable distance in the back-ground are seen two doctors of the Jewish law, who have listened to the discourse, rejected the mission, and turned their backs on the speaker and the place. On the first glance at the cartoon the eye is arrested by the figure of St. Paul, which the painter has invested with every circumstance which can give it dignity and importance. We learn from the Apostle himself that his exterior was not imposing; but Raffaelle, knowing that painting can express its meaning only through the medium of form, has departed from the literal fact, and given him an appearance corresponding to the sacredness of his character. He stands in front, on an elevated site, and considerably apart from his audience. His action unites the almost incompatible qualities of sedateness and energy. It is simple and majestic, but kindled by divine enthusiasm; and we are at once impressed with the idea that he is pouring forth a torrent of eloquence overwhelming and irresistible. The immediate effect, as well as the eventual triumph of his doctrine, is intimated by the conversion of Damaris, and of Dionysius the Areopagite, the foremost persons in the picture, who announce, with impassioned looks and gestures, their renunciation of idolatry, and acceptance of the Christian faith.

The buildings which occupy the back-ground (although betraying some inconsistencies in point of architectural style) are in themselves beautiful objects; but they are immediately connected with the subject, being the temples of the Pagan deities, whose idolatrous worship the Apostle is denouncing. These edifices may be considered also, together with the statues which surround them, to characterize the city of Athens, the mother of arts, and the seat of taste, wealth, and splendour. Throughout the works of Raffaelle, in the subordinate as well as the principal parts, we perceive the same penetrating intelligence; and these Cartoons especially, beyond any works of art extant, may be pronounced to be abstractions of pure intellect. We cannot forbear repeating a wish which we have already expressed, that when the new National Gallery is finished, these noble works may be removed to it: if it may be hoped that a taste for historic art will ever be created in this country, we can imagine nothing more likely to promote that object, than giving the public opportunity for the habitual contemplation of the Cartoons.

ÆSCHYLUS.

WE have already presented our readers with an extract from one play of Æschylus, which may serve to give some idea of his style. We now propose to give another from the play of the Persians, which was written a few years after the destruction of the navy of Xerxes in the great sea-fight of Salamis, B.C. 480. The position of Salamis, with respect to the neighbouring coast of Attica, may be seen in any correct map.

In the Greek tragedies, it was not the practice for the main event, or the great catastrophe, of the piece to be exhibited on the stage; but instead of this a messenger comes in, and tells the story. Atossa, the mother of Xerxes, while waiting in the royal palace of Susa (the Shushan of the Scriptures) in anxious expectation to hear something about her son, receives the intelligence of the total destruction of the Persian armament by the combined Grecian fleet. After this announcement the messenger proceeds to describe that memorable conflict in which Æschylus himself was engaged.

Messenger. The cause of all the mischief, O Queen, was an evil-minded spirit or dæmon coming, nobody knows wherefrom. For a Greek from the army of the Athenians told your son Xerxes, that as soon as the darkness of black night came, the Greeks would not stay, but springing on the benches* of their ships would seek to save their lives by stealthy flight, each as he best could. As soon as Xerxes heard this, not discovering the guile of the Greek, nor the malevolence of the God, he gives these orders to all the commanders of ships:—When the sun has ceased to burn the earth with his rays, and darkness has filled the circuit of the heavens, place a compact body of ships in three lines to watch the outlets and the narrow passes in which the waters roar.—And other ships he bade them place around the island of Ajax (Salamis); and should the Greeks avoid a wretched fate by a stealthy flight in their ships, the sentence was that every captain should lose his head. Thus he spake with a heart full of pride, for he knew not what was coming from the Gods. Not reluctant, but with obedient spirit, they got ready their evening meal, and every seaman strung his oar to the well-fitted peg. When the light of the sun had faded, and night had come on, every master of an oar stepped on shipboard, and every man at arms. And each line of ships called to its neighbour, and they sailed each in his station; and all night long the commanders of the ships kept the naval force cruising about. Night passed on; but the Grecian armament were making no preparation to escape in secret. For soon as Day with his white horses

* The ships, or rather long boats, were worked by oars.

spread over the white earth, gloriously bright to behold, with a loud noise sprung a joyful shout like a song from the Greeks, and at the same time Echo called out in reply from the island rocks. Fear fell on the barbarians who were balked in their hopes, for the Greeks sung then the sacred pæan, not as if they thought of flight, but like men rushing to the battle with courageous daring. And the trumpet with its voice urged them on. With the well-timed stroke of the dashing oar they beat the roaring sea to the word of command, and quickly the whole fleet was full in view. First came the right wing in good array; behind followed all the fleet, and now we heard the sound of many voices: *Sons of the Greeks, advance, save your native land, and save your children and your wives, and the temples of your fathers' gods, and your fathers' tombs: now you fight for all.* On our part a shout in the Persian tongue replied; and the moment of action was no longer delayed. Straightway ship dashed against ship with its brazen beak: a Grecian ship began the conflict and broke off the head of a Phœnician galley; and each drove his ship against his adversary. At first the tide of the Persian army resisted; but when the ships were crowded in a narrow space, and there was no help from one another, then were they struck by the brazen-armed beaks of friendly ships, their oars were broken and swept away, while the Grecian ships skilfully attacked them on all sides. And the hulls of ships were turned bottom upward, and the sea could no longer be seen, so full was it of wrecks and human bodies. The shores too and the rocks that heaved their backs above the waves were full of the dead, and every ship of the barbarian army was urged along by the rowers in unseemly flight. But the Greeks, as the fishermen do with tunnies or a cast of fish, struck the floating wretches with fragments of oars, and pieces of wreck, and cleft them in twain; and groans with shrieks overspread the surface of the sea, till the eye of dark night took them away. But the fulness of our evils, even were I to go on telling for ten days in succession, I could not measure out to thee; for be well assured that never before did so many men die on one day.

CHEAP BOOKS.

[The ninth number of the 'Quarterly Journal of Education' contains the following statements, in illustration of the principle upon which books in large demand may be sold at a very low price.]

It has been well observed in the posthumous work of an acute thinker, Chenevix, that "the bent of civilization is to make good things cheap." We will endeavour to explain this as regards printing, by a few facts, to show that the extension of the market, whilst it diminishes price, does not deteriorate quality.

There are certain expenses of a book which are permanent, whatever number be sold. These expenses are—

1. Authorship.
2. Embellishments.
3. Composition of types, including stereotype plates, if that process be employed.
4. Advertising.

Now, it must be evident, if 1000 purchasers co-operate to pay those permanent expenses, the proportion to each purchaser can only be half as much as if there were only 500 purchasers. Take an octavo volume, for example, and assume the following items of expense:—

Author	£200
Artist	50
Composition of types	75
Advertising	50
	£375

If 500 copies only of this octavo volume be estimated to be sold, the price which the publisher must fix upon it must be such as to cover an outlay, to be incurred in such permanent expenses alone, of 15*s.* per copy;—if 1000 copies be estimated to be sold, the expense of these items upon each copy is reduced to 7*s.* 6*d*; if 2000, to 3*s.* 9*d.*; if 3000, to 2*s.* 6*d.* The greater, therefore, the probable number of purchasers, the cheaper the book can be sold. It is the province of the publisher rightly to calculate these chances. If he fix a high price, and have a large sale, there are great profits to the publisher, and in many cases to the author; if the high price so fixed, or any other cause, prevent a large sale, the profits are small, or there is a loss;—if a low price is fixed, and the sale be at the same time small, the losses are considerable. It is this uncertainty which renders the business of publishing so much a matter of speculation; and in this respect it is a very unsatisfactory business to those who follow it.

Let us apply this principle to such a work as the Penny Magazine. We will take the permanent expenses at 40*l.*, for a single number. These are the expenses, be it remembered, which are incurred whether 200 or 200,000 copies are sold—the expenses previous to the employment of a single sheet of paper or a single hour's labour in printing off the copies. Forty pounds contain 9600 pence; so that if 10,000 copies only were sold, the publisher would give away his paper and print, and pay the profit of the retailer. At that rate of sale a penny magazine must of necessity be a two-penny magazine, or the work could not go on without the subscriptions of individuals. But if 20,000 purchasers co-operate to pay the 9600 pence, the penny that formerly bore upon each copy is reduced to a halfpenny; if 40,000 co-operate, it is reduced to a farthing. But the sheet of paper and the printing off still cost somewhat more than a halfpenny—and as the various wholesale and retail dealers who manage the sale are allowed about forty per cent., the paying point is not yet reached: -it begins at about 60,000 or 70,000; and after that sale there is a profit. A sale of 60,000 or 70,000 is therefore essential to the commercial existence of such a work as the Penny Magazine:- that is that number of purchasers must co-operate to pay the expenses which are absolutely necessary to be incurred before a single copy is sold.

MINERAL KINGDOM.—Section 2.

In furtherance of the design expressed in our last number, we now proceed to lay before our readers a brief general outline of the leading doctrines of geology, such as they are now generally received. The term is derived from two Greek words meaning a *discourse* (logos), respecting the *earth* (gea), and we have already explained the objects of inquiry which this department of science comprehends. In giving this outline it must be borne in mind that it is not our purpose to give even an elementary treatise on geology, but solely to render our descriptions of some of the principal mineral productions that we meet with in common life more intelligible. We mean to confine ourselves to the great general truths which have been discovered, and that, too, without entering upon any detail of the proofs and reasonings upon which these have been established: to have gone into these, so as to serve any useful purpose, would have required us to enter into discussions inconsistent with the plan of our publication. If, therefore, some of our statements shall seem startling, and even improbable, as they are very likely to do to such of our readers as come new to the consideration of the subject, they must either give us credit for advancing nothing but what is admitted by men of science as an established truth, or they must take the trouble to investigate the subject for themselves, and satisfy their doubts by applying at the original sources of information. We shall avoid, as much as possible, the employment of terms that are not likely to be understood by the generality of readers; but we may be sometimes unable entirely to fulfil our wish in that respect, especially in naming rocks and minerals. To give by words alone such a description of a stone that a true image of it can be presented to the mind of the reader, is impossible; the substance itself must be seen: but it is not necessary for our present purpose that more should be known about mineral bodies, than what it is in the power of every one who will look a little about him in the ordinary course of life.

It may be necessary to remind our readers that the earth is a round body of a somewhat flattened shape, the diameter from pole to pole being about twenty-seven

miles less than that passing through the equator; that more than three-fifths of its surface is covered by the ocean; that the land rises from the surface of the sea in the form of islands and of great continuous masses called continents, without any regularity of outline, either where it comes in contact with the water, or in vertical elevation,—its surface being diversified by plains, valleys, hills, and mountains, which sometimes rise to the height of twenty-six thousand feet above the level of the sea. Numerous soundings in different parts of the world have shown that the bottom of the ocean is as diversified by inequalities as the surface of the land: a great part of it is unfathomable to us, and the islands and continents which rise above its surface, are the summits of mountains, the intervening valleys lying in the deepest abysses.

Different climates produce different races of animals, and different families of plants; but the mineral kingdom, as far as the nature of stone is concerned, is independent of the influence of climate, the same rocks being found in the polar and in the equatorial regions. Although there is considerable diversity in the structure of the earth, it is not in any degree connected with particular zones, as far as relates to circumstances which are external to it; nor can we say that the wonderful action which burning mountains tell us is going on in its interior, is confined to any part of the sphere, for the volcanic fires of Iceland burn as fiercely as those that burst forth under the line. From all the observations hitherto made, there is no reason to suppose that any unexplored country contains mineral bodies with which we are not already acquainted; and although we cannot say beforehand of what rocks an unexamined land is likely to be composed, it is extremely improbable that any extensive series of rocks should be found, constituting a class different from any which have been already met with in other parts of the globe.

When we dig through the vegetable soil, we usually come to clay, sand, or gravel, or to a mixture of these unconsolidated materials; and, in some countries, we shall probably find nothing else, at the greatest depths to which we are able to penetrate. But in most places, after getting through the clay and gravel, we should come upon a hard stone, lying in layers or beds parallel to each other, either of one kind or of different kinds according to the depth; and which would vary in different countries, and in different places in the same country, as well in its constituent parts, as in the thickness, alteration, and position of its beds or layers. It has been ascertained by the observations of geologists, in various parts of the world, that the crust of the earth is composed of a series of such layers, distinguishable from each other by very marked characters in their internal structure. The elements of which they are composed are not very numerous, being for the most part the hard substance called quartz by mineralogists, of which gun-flints may be cited as a familiar example, these being wholly composed of it, and the well-known substances, clay and limestone; but these elements are aggregated or mixed up together in so many proportions and forms, as to produce a considerable variety of rocks. Besides this elementary composition, or what may be termed their *simple* structure, the greatest proportion of the rocks that are so arranged in layers contain foreign bodies, such as fragments of other rocks, shells, bones of land and amphibious animals and of fishes, and portions of trees and plants. It has further been found that these different layers or *strata*, as they are scientifically called (from the plural of the Latin word *stratum*, signifying a bed), lie upon each other in a certain determinate order, *which is never, in any degree, inverted*. Suppose the series of strata to be represented by the letters of the alphabet, A being the stratum nearest the surface, and Z the lowest: A is never found *below* Z nor under any other of the intervening letters; nor is Z ever found *above* any of the letters that stand before it in the alphabet; and so it is with all the strata represented by the other letters. This will be rendered more clear by the annexed diagram, which is an imaginary section of the crust of the globe, representing a series of different strata. On one side there is a general description of the nature of the stone; on the other the name of some particular place where that stratum is to be seen. It must not however be imagined, although this regularity *in the order* of superposition exists, that all the different members of the series always occur together; on the contrary, there is no instance where they have all been found in one place. It possibly may happen that where C is found in a horizontal position, by going deeper all the rest would follow in succession, but this we can never know, as the thickness would be infinitely beyond our means of penetrating; and there are reasons which render the existence of such an uninterrupted series extremely improbable. It very seldom happens that more than three or four members *of the series* can be seen together;—we say of the series, because each member is composed of an almost infinite number of subordinate layers. This order of succession, established by geologists, has been determined by the combination of many observations made in different countries at distant points. The order of three or four members was ascertained in one place; the *upper* stratum in that place was found to be the lowest member of a second series in another place, and the *lowest* stratum at the first station was observed to be the uppermost at a third point; and in like manner the order of superposition was discovered throughout the whole range. Neither is it to be supposed that the strata which lie next each other in the diagram are always so in nature; as for instance, that wherever G is found associated with another member it is always either with F above it or H below it. it very often happens that F lies upon H, G being altogether absent; and C may even be seen lying on R, the whole of the intervening members of the series being wanting. Very frequently one of the lowest members of the series appears at the surface. Every one knows that sometimes chalk, sometimes slate, lies immediately beneath the vegetable soil, or even at the surface without that scanty covering; but if a lower member of the series represented in the diagram be seen at the surface, however deep we might go, we should never find any one of those rocks that belong to the higher members of that series. The immense practical advantage of this knowledge of the determinate order of succession will be seen at once; for if O, or any of the lower members of the series, were found to occupy the surface of the country, it would be at once known that all search for coal in that spot would be fruitless.

Our readers will doubtless be curious to know by what means geologists have been enabled so decidedly to fix the above order of succession. If they had had nothing to depend upon but the mineral composition of the rock, (what we have termed its simple structure), they would never have arrived at this knowledge; for as far as that is concerned, rocks are met with among the upper members of the series, which cannot be distinguished from those in the lower beds. They have arrived at the important conclusion by a far less fallible guide; for every stratum contains, within its own domain, records of its past history, written in characters intelligible to all nations, which no possible events can falsify or destroy, and which have enabled the geologists to arrive at some conclusions possessing all the certainty of mathematical demonstration. But to keep within our prescribed limits, and at the same time avoid the inconvenience of breaking off in the midst of this subject, we must defer to our next paper on the Mineral Kingdom the account of these curious documents of the ancient history of the earth.

(DIAGRAM, No. 1.)

ORDER OF SUCCESSION OF THE DIFFERENT LAYERS OF ROCKS WHICH COMPOSE THE CRUST OF THE EARTH.

		Nature of the different kinds of Rocks and Soils.	Instances where they are found.
	A.	Vegetable soil	
	B.	Sand, clay, gravel, with bones of animals of same species as now exist	Mouth of Thames and other rivers.
	C.	Deep beds of gravel, large loose blocks, sand—all containing bones of animals belonging to species now extinct	Surface of many parts of England, and especially the eastern and south-eastern parts.
Tertiary Strata.	D.	Sand, clay, pebbles, beds of hard white sandstone—many sea shells, bones of extinct species of animals	Hampstead Heath, Bagshot Heath, coast of Suffolk and Norfolk—stone of which Windsor Castle is built.
	E.	Alternations of limestones, containing fresh-water shells, clays of different qualities, and limestones containing marine shells.	Isle of Wight.
	F.	Thick beds of clay, with many sea shells; beds of limestone—remains of extinct species of plants and fruits, land and amphibious animals	Many places round London, great part of Essex, and north-east of Kent, Isle of Sheppey. Woolwich, Cliffs at Harwich, Isle of Wight.
Secondary Strata.	G.	Chalk with flints	Dover Cliffs, Brighton, Hertfordshire.
		Chalk without flints	Flamborough Head in Yorkshire.
	H.	*a.* Chalk marl	Many parts of south coast, Kentish rag.
		b. Green sand	Many parts of Kent and Sussex.
		c. Thick beds of clay	The Weald of Kent, Surrey, and Sussex.
		d. Yellow sand, with beds of iron ore	Neighbourhood of Hastings and Isle of Purbeck.
		e. Argillaceous sandstone	Flat pavement of London, very often.
	I.	*a.* Limestones of different qualities	Portland building stone.
		b. Beds of clay	Kimmeridge, on coast of Dorsetshire.
		c. Limestones with corals	Neighbourhood of Oxford.
		d. Beds of clay	Extensively in Lincolnshire fen clay.
		e. Thick beds of limestone	Bath building stone.
		f. Thin beds of limestone and slaty clay	Whitby, Gloucester, Lyme Regis.
	K	Red marly sandstone, often containing beds of alabaster or plaster-stone, and beds of rock salt	Great part of East Yorkshire, Nottinghamshire, Stafford, Warwick, Worcester, Cheshire, and neighbourhood of Carlisle.
	L.	Limestone containing much magnesia	Sunderland, Ferrybridge in Yorkshire, Mansfield, Notts.
	M.	COAL MEASURES, containing various seams of coal—beds of ironstone, clay, sandstone, and freestones of various qualities	Newcastle, many parts of Yorkshire, Lancashire, Staffordshire, Somersetshire, vale in which Edinburgh and Glasgow are situated, South Wales.
	N.	Coarse sandstone and slaty clay	Millstones of Newcastle and Derbyshire.
	O.	Thick beds of limestone, and slaty clay and sandstone, in many alternations	Deposits of the lead ore of Derbyshire, Yorkshire, Northumberland, Cumberland. High Peak of Derbyshire, mountains in Yorkshire, Mendip Hills, Somerset.
	P.	Dark red sandstone, with many beds of pebbles	Great part of Herefordshire, and south-east part of South Wales, Banks of the Wye, south of Scotland.
	Q.	Thick beds of slate and sandstone, with sometimes impressions of shells, with thick beds of limestone	Cumberland and Westmorland Mountains, great part of Wales, north of Devon, South Devon, and Cornwall, great part of south of Scotland.
Primary Strata.	R.	Slates and many hard rocks lying in alternating beds, in which no trace of animal remains has been found, of great thickness, and the lowest that have been reached	Chief part of the Highlands of Scotland.

A PARTY OF EMIGRANTS TRAVELLING IN AFRICA.

In the year 1820, about 5000 British emigrants were conveyed to South Africa, under the patronage of Government, with a view to colonize certain tracts of unoccupied territory near the frontier of Cafferland, on the eastern extremity of the Cape Colony. The emigrants were disembarked at Algoa Bay, about 600 miles from Cape Town; and there encamped under their respective leaders, until they could be furnished with waggons to convey them and their goods into the interior. None of the parties consisted of fewer than ten adult males, besides women and children; and some amounted to as many as a hundred families or upwards, associated for mutual support, and accompanied by their respective clergymen, or other religious instructors. A considerable number of gentlemen of education and intelligence, (chiefly military and naval officers on half pay,) were also among the leaders; so that the new settlement comprised within its own body suitable materials for the immediate formation of a well-organized community. The history of this settlement, however, though neither uninteresting nor uninstructive, is not our present object. We mean merely to give the reader a sketch of one of those parties journeying through the wilds of Africa to their remote location in the interior.

The writer of this notice happened to be the leader of the band now referred to, which was one of the smallest of that body of emigrants. It consisted of a few families of Scottish farmers, amounting altogether to twenty-three persons, including children and servants.

We struck our tents at Algoa Bay on the 13th of June, which is about the middle of winter in the southern hemisphere. The weather was serene and pleasant, though chill at night—somewhat like fine September weather in England. Our travelling train consisted of seven waggons, hired from Dutch-African colonists, and driven by the owners or their native servants—slaves and Hottentots. These vehicles appeared to be admirably adapted for the country, which is rugged and mountainous, and generally destitute of any other roads than the rude tracks originally struck across the wilderness by the first European adventurers. Each waggon was provided with a raised canvas tilt to protect the traveller from sun and rain; and was drawn by a team of ten or twelve oxen, fastened with wooden yokes to a strong central trace, or *trek-tow*, framed of twisted thongs of bullock's or buffalo's hide. The driver sat in front to guide and stimulate the oxen, armed with a whip of enormous length; while a Hottentot or Bushman boy, running before, led the team by a thong attached to the horns of the foremost pair of bullocks. Where the road was bad and crooked, or when we travelled at a rapid rate, as we frequently did on more favourable ground, these poor leaders had a very toilsome task; and if they made any mistake, or in aught displeased the lordly *baas* (the gruff boor who sat behind), his formidable lash was not unfrequently applied to their naked limbs. These African whips are truly tremendous implements. In ascending some of the mountain passes, when the whole strength of the oxen, and occasionally of two or three teams yoked together, was required to drag up our heavy-loaded waggons, the lash was used with such unsparing vigour that the flanks of the bullocks were sometimes actually streaming with blood.

These rude African farmers, however, have their good points. Their faults and vices, so far as they are peculiar, are evidently the effect of their unfortunate situation in being slave-holders. When not crossed in their humour, they are usually civil and obliging; and we continued on friendly terms with them to the end of our journey.

At the close of the first day, we encamped in the midst of an immense forest, or jungle, of shrubbery, at the distance of a few miles from a remarkable salt lake which has been described in a previous number. This we visited in order to provide ourselves with a supply of salt for culinary purposes. Our encampment this night was to our yet unexperienced eyes rather a singular scene. Some families pitched their tents, and spread their mattresses on the dry ground; others, more vividly impressed with the terror of snakes, scorpions, tarantulas, and other noxious creatures of the African clime, resolved to sleep as they had travelled—above their baggage in the waggons. Meanwhile our native attendants adopted due precautions to avert surprise from the more formidable denizens of the forest. Elephants and lions had formerly been numerous in this part of the country, and were still occasionally met with. Two or three large fires were therefore kindled to scare away such visitants and the oxen, for greater security, were fastened by their horns to the wheels of the waggons. The boors unslung their huge guns (or *roers*, as they called them) from the tilts of the waggons, and placed them against a magnificent evergreen bush, in whose shelter, with a fire at their feet, they had fixed their place of repose. Here, untying each his leathern scrip, they produced their provisions for supper, consisting chiefly of dried bullock's flesh, which they washed down with a moderate *sopie*, or dram, of colonial *brandewyn*, from a huge horn slung by each man in his waggon beside his powder-flask. The slaves and Hottentots, congregated apart round one of the watch-fires, made their frugal meal, without the brandy, but with much more merriment, than their phlegmatic masters. In the meanwhile our frying pans and tea-kettles were also actively employed; and by a seasonable liberality in the beverage "which cheers but not inebriates" we ingratiated ourselves not a little with both classes of our escort, especially with the coloured caste, who prized "tea-water" as a rare and precious luxury.

It was not a little amusing after supper to contemplate the characteristic groups which our rustic camp exhibited. The Dutch-African boors, most of them men of almost gigantic size, sat apart in their bushy *bield*, in aristocratic exclusiveness, smoking their huge pipes with self-satisfied complacency. Some of the graver emigrants were seated on the trunk of a decayed tree, conversing in broad Scotch on subjects connected with our settlement, and on the comparative merits of long and short-horned cattle (the horns of the native oxen are enormous): and the livelier young men and servant lads were standing near the Hottentots, observing their merry pranks, or practising with them a lesson of mutual tuition in their respective dialects; while the awkward essays at pronunciation, on either side, supplied a fund of ceaseless jocularity. Conversation appeared to go on with alacrity, though neither understood scarcely a syllable of the other's language; and a sly rogue of a Bushman sat behind, all the while, mimicking, to the very life, each of us in succession. These groups, with all their variety of mien and attitude, character and complexion,—now dimly discovered, now distinctly lighted up by the fitful blaze of the watch-fires; the exotic aspect of the clumps of aloes and euphorbias, peering out amidst the surrounding jungle, in the wan light of the rising moon, seeming to the excited fancy like bands of Caffer warriors crested with plumes and bristling with assagais; these appearances, together with the uncouth chuckling gibberish of the Hottentots and Bushmen, and their loud bursts of wild laughter, had altogether a very strange and striking effect, and made some of us feel far more impressively than we had yet felt, that we were now indeed houseless pilgrims in the wilds of savage Africa.

By degrees, the motley groups became hushed under the influence of slumber. The settlers retired to their

tents or their waggons; the boors, sticking their pipes in their broad brimmed hats, wrapt themselves in their great coats, and fearless of snake or scorpion, stretched their huge bodies on the bare ground; and the Hottentots, drawing themselves each under his sheep-skin *caross*, lay coiled up, with their feet to the fire and their faces to the ground, like so many hedgehogs. Over the wide-stretching wilderness, now reposing under the bright midnight moon, profound silence reigned,—unbroken save by the deep breathing of the oxen round the waggons, and, at times, by the far-off melancholy howl of a hyæna, the first voice of a beast of prey we had heard since our landing. With the nightly serenade of the jackal and hyæna we soon became familiar; nor did any more formidable visitants disturb our repose during our journey.

[To be continued.]

MY BIRTH-DAY.

"My birth-day!"—What a different sound
  That word had in my youthful ears!
And how, each time the day comes round,
  Less and less white its mark appears!

When first our scanty years are told,
  It seems like pastime to grow old;
And, as youth counts the shining links
  That Time around him binds so fast,
Pleased with the task, he little thinks
  How hard that chain will press at last.

Vain was the man, and false as vain,
  Who said, "were he ordained to run
His long career of life again,
  He would do all that he *had* done."—
Ah! 'tis not thus the voice that dwells
  In sober birth-days speaks to me;
Far otherwise—of time it tells
  Lavished unwisely, carelessly—
Of counsel mock'd—of talents, made
  Haply for high and pure designs,
But oft, like Israel's incense laid
  Upon unholy, earthly shrines—
Of nursing many a wrong desire—
  Of wandering after Love too far,
And taking every meteor fire
  That cross'd my path-way for his star!
All this it tells, and could I trace
  The imperfect picture o'er again,
With power to add, retouch, efface
  The lights and shades, the joy and pain,
How little of the past would stay!
How quickly all should melt away—
All—but that freedom of the mind
  Which hath been more than wealth to me:
Those friendships in my boyhood twined,
  And kept till now unchangingly.
And that dear home, that saving ark,
  Where Love's true light at last I've found,
Cheering within, when all grows dark,
  And comfortless, and stormy round!

MOORE.

LORD BACON.

THE twenty-second of January is the birth-day of the illustrious FRANCIS BACON, whom we are here to regard principally as the founder of the Experimental or Inductive Philosophy. There can be no doubt that the whole of men's knowledge of external nature must have been originally derived from observation. We are not born with any idea even of such simple truths as that a stone is hard, and that it will fall to the ground if dropped from the hand. These and all other facts must have been observed before they could be known. Observation, then, and that alone, was the mother of natural philosophy. First, so many separate facts were collected; then, they were arranged into different groups according to certain characters which were found to be common to all those that were placed together; and in this way were obtained what we call the general truths of science, which are nothing more than expressions of such common principles. We need no historical evidence to prove that this was the course actually followed; for it evidently must have been so: there was no other way by which the general truths in question could have been arrived at. It is possible, however, that in a succeeding age these general truths might in many cases be proclaimed without the particular instances on which they were founded. In this way philosophy would at length put on the air of a body of broad and lofty abstractions, not resting upon any visible foundation of experience. It is easy to conceive how difficult and almost impossible it would be for the truths thus separated from their proper support to remain long unmixed and unsophisticated.

We may thus account for the form which the philosophy of the ancients eventually assumed. In its most matured state it was undeniably, to a considerable extent, under the dominion of certain preconceived opinions, some true, others false, and others partly true and partly false, but of all of which it may be said that the evidence which was to establish or refute them was seldom sought for where alone it was really to be found—in the facts of nature. It would be extremely incorrect, however, to suppose that the examination of nature was altogether neglected. Very far from it. The most eminent of the Greek philosophers were most assiduous and most accurate observers. For proof of this, we need only refer to such works as Aristotle's History of Animals and the medical treatises of Hippocrates. The true distinction between them and the moderns is, that, although *observers*, they were not *experimenters*. They heard, and recorded correctly enough, what nature stated of her own accord, but they asked her no questions.

It is a most remarkable fact, and one vividly illustrative of the weakness and inefficiency of a philosophy so constituted, that for the long space of nearly two thousand years it not only remained unproductive, but actually went back and decayed every day more and more. From the age of Democritus, Hippocrates, and Aristotle, four hundred years before the birth of Christ, down to nearly the middle of the sixteenth century of our era, men, instead of making any progress in the method of prosecuting the study of nature, had been gradually sinking into deeper and deeper ignorance and blindness in regard to every thing appertaining to that branch of science. Accidental discoveries may have occasionally turned up to add a few items to their stock of facts, though not, there is reason to believe, to an extent sufficient to make up for those which were continually dropping away into forgetfulness; but of philosophy itself, properly so called, there was nearly all the while a decline like that of the twilight after the sun has sunk below the horizon. Certain general principles, sanctioned by the authority of great names, or the tradition of the schools, were considered as forming the necessary foundation of all truth. No attempt was made, or so much as thought of, to test these sacred affirmations by the actual investigation of nature: the aim was always to reconcile the fact to the doctrine, not the doctrine to the fact. At last the explication, and we might almost say the worship of these principles became nearly the sole occupation of the professors of philosophy; even the collecting of new facts by means of observation was entirely given up. This was the state of things during what are called the middle or the dark ages, which may be described as comprehending the thousand years from the taking of Rome by the Goths in the middle of the fifth century, to the taking of Constantinople by the Turks in the middle of the fifteenth.

After this last-mentioned event, and the revival of letters in the west, which was brought about mainly by the learned exiles whom the destruction of the Grecian empire forced to take refuge in Italy, the human intellect did indeed manifest a disposition, in almost all departments of science, to throw off the yoke of prejudice and authority to which it had so long resigned itself. In natural philosophy, as well as in other studies, various

intrepid and original thinkers arose, determined to make their way to the knowledge of truth by their own efforts, and to look into the realities of nature with their own eyes. These men well deserve to be accounted the pioneers of Bacon. But it was not till he arose, that the war against the old despotic formalities of the schools was commenced on any thing like a grand scale, or carried on with adequate vigour and system. It was he who actually effected the conquest—who dispersed the darkness and brought in the light. This he did by the publication of his 'Novum Organon Scientiarum,' or New Instrument of the Sciences.

Bacon was born in 1561, and was the son of Sir Nicholas Bacon, for more than twenty years keeper of the great seal. He was educated at Trinity College, Cambridge, after leaving which he entered himself a student of Gray's Inn, with the object of following his father's profession of the law. In this profession, and in public life, he rapidly rose to the highest eminence; and in 1619 he was made Lord High Chancellor of England, and created Baron Verulam, to which title was added, the following year, that of Viscount St. Albans. Bacon's political course, up to this time, had not been very remarkable for disinterestedness or independence; and it was destined to terminate suddenly in disgrace and sorrow. In March, 1621, he was impeached by the House of Commons for corruption in his high office; and his own confession soon after admitted the truth of the accusation in nearly all its force: on which he was immediately deprived of the seals, and sentenced to be fined, imprisoned during the King's pleasure, and for ever excluded from parliament and all public employments. He afterwards obtained a remission of the hardest parts of his sentence: but he only survived till the 9th of April, 1626, on which day he died suddenly at the Earl of Arundel's house at Highgate. Intellectually considered, he was so great a man, that his character and conduct, as an historical personage, are commonly, as it were by general consent, in a very singular degree overlooked and forgotten when we mention the name of Bacon. It is worthy of notice, as a curious evidence of how little the delinquencies and misfortunes of the politician, memorable as they were, were some time after his death known or noted in those parts of the world which were most filled with the fame of the philosopher, that Bayle, in his Dictionary, published in 1695, and again in 1702, has given us an article on Bacon, in which he does not so much as allude to his lamentable fall, being evidently ignorant that such an event had ever taken place.

The method of philosophy recommended and taught in the 'Novum Organon' is that of experiment and induction. Experimenting was a favourite employment of philosophers even in the dark ages. The chemists or alchemists, for instance, of those days, were continually making experiments. But their experiments were all made simply for the purpose of obtaining a particular material result; never with the object of detecting or testing a principle. Thus, they mixed or fused two or more substances together, in the hope that the combination might yield them the *elixir vitæ*, or the universal tincture; but they never resorted to a course of experiments to ascertain whether nature, as was asserted in the schools, really abhorred a vacuum, or to try the alleged incompressibility of water, or to bring to the proof any of the other commonly received dogmas of a similar description. It may be safely affirmed, that they never dreamed of experimental philosophy in this sense. Now this was the method of experiment to which Bacon called the attention of philosophical inquirers, and of which he first fully laid open the character, the uses, and the rules. By induction, again, he meant merely the bringing in or collecting of facts, and the assorting of them according to their bearings, for the purpose of thence deducing those inferences which properly constitute philosophy. Although the Baconian philosophy has been called the philosophy of induction, the phrase is to be taken as referring merely to the foundation on which it rests. Induction is not its object, but only one of its instruments; not its end, but its beginning. Its great author sufficiently expressed his sense of the true place which mere induction held in philosophy, when he used, as we are informed by his chaplain, Dr. Rawley, in his Preface to Bacon's 'Sylva Sylvarum,' to complain, in allusion to his task of collecting the facts in that work, that he, who deserved "to be an architect in this building, should be forced to be a workman and a labourer, and to dig the clay and burn the brick." But on the other hand, he held it to be essential that this work should be performed by some one. He maintained that no philosophical truth or general principle could be obtained by any other method than by the induction of facts, or was entitled to acceptance, except in so far as it was supported by that testimony. The fundamental tenet, in short, of his philosophy is announced in the opening sentence of the 'Novum Organon:'—"Man, the servant and interpreter of Nature, understands and reduces to practice just so much as he has actually experienced of Nature's laws; more he can neither know nor achieve."



[Portrait of Bacon.]

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COLOGNE.



[Church of St. Martin, Cologne.]

COLOGNE, called by the Germans Cöln, is situated in a district of the same name, which is one of the two divisions of the Prussian province of Jülich-Cleve-Berg, so called from its containing the three old duchies of Jülich or Juliers, Cleve, and Berg. Cologne is the capital of the whole province, and stands on the left or west bank of the Rhine, N. L. 50° 55', E. L. 6° 45', forming a kind of semicircle. The city is fortified, and with its numerous spires and large buildings makes a good show from the opposite side of the river. It is about one hundred and seven miles east by north from Brussels. Cologne was an old Roman station often mentioned in Tacitus, and took its name of Colonia Claudia Agrippinensis, or "the Colony of Claudius and Agrippina," from Agrippina the

daughter of Germanicus Cæsar, who was some time in these parts at the head of the Roman army. Agrippina, at the time when her name was given to the colony, was the fourth wife of her uncle, the feeble and worthless Emperor Claudius *; and was born at this place while her illustrious father commanded in Germany. The Roman word "colonia," *colony*, has been corrupted by the French into Cologne, and by the Germans into Cöln.

Under the Germanic Empire, Cologne was a free Imperial city, and had both a seat and voice as well in the Diets or Assemblies of Westphalia as in those of the Empire. At this time the Elector of Cologne occasionally resided here, as well as the Chapter of the Archbishop of Cologne and a Nuncio of the Pope. Urban VII. established a university here in 1388, to which succeeding Popes granted privileges. It is still the seat of a Catholic Archbishopric, but the university as such no longer exists.

Cologne cannot on the whole be called a handsome city, its streets being crooked, narrow, and dirty; but it has a great number of public buildings, and among them thirty-three churches and chapels. The population in 1830 was 65,145. The cathedral is a noble building, 400 feet long and 180 wide, which, owing to its magnitude, is a conspicuous object from a distance, overtopping every other edifice in the city. The body of the cathedral is supported by 100 pillars. Two high towers were designed for this building, one of which is raised to only about half the height intended, and the other is hardly begun. Were the cathedral completed, it is generally allowed it would be one of the finest Gothic buildings in Europe. Behind the high altar is the chapel of the three holy kings, or three wise men, as they are sometimes called, made of marble; the shrine which contains the bodies is remarkable for the curious and elaborate ornaments with which it is decorated. The names of the three wise men, according to some accounts, are Gaspar, Melchior, and Balthasar, whose bones, as the story goes, were first taken to Constantinople by the Emperor Constantine's mother; thence they were transferred to Milan; and finally obtained a sumptuous mausoleum in Cologne. What the precise merits of Gaspar, Melchior, and Balthasar were, we have not been able to make out satisfactorily. The parish church of St. Peter contains the Crucifixion of the Apostle, one of Rubens' finest pictures, which he gave as a present to the church in which he received the rite of baptism. This distinguished painter was a native of Cologne. The picture travelled to Paris during the time when the French were so busy in appropriating to themselves all the valuable works of this kind which they could lay their hands on: after the downfall of Bonaparte it returned home.

In the church of St. Ursula we see the tomb of this holy Virgin, and, as the legend would have us believe, the bones of her 11,000 virgin companions and martyrs: the church does in fact contain an immense number of bones, and in a certain chamber, some accounts say, there are, or were, several thousand skulls, arranged in good order and adorned with garlands and coronets. The fact of the bones being there seems undoubted; the proof of their belonging to the holy virgins does not seem quite so clear.

Besides these there are many other handsome churches in Cologne, one of which, the church of St. Martin, is represented in the wood-cut. This view is given, not so much for the beauty of the church, as to exhibit the general style of architecture in this old city.

The town-house has a fine portal formed by a double row of marble pillars. The old Jesuits' college, an extensive building, now contains a gymnasium or high school, with a library, a seminary for priests, and a valuable collection of old German paintings.

The situation of Cologne makes it a place of considerable trade, particularly with the German town of Frankfort-on-the-Main and Holland. In 1822, 4415 vessels of various sizes arrived at the town, and 2832 left it. The manufactures of Cologne are considerable; twenty-five tobacco manufactories, cotton, silk, and woollen wares, earthenware, soap, candles, &c.; and Cologne water, or *Eau de Cologne*, as it is commonly called, which is said to be made at twenty-four different establishments. The virtues of this water must be well known to all our readers; but if they have still any doubts on the subject, it is only necessary to read the printed French advertisement, which generally accompanies the bottle, and it is impossible to dispute the virtues of the commodity which the manufacturers extol so highly. A great deal of brandy is made at Cologne. The book manufactory of the town employs eighteen establishments and forty-two presses.

The public library of 60,000 volumes, the botanic garden, the school for the deaf and dumb, the various collections and cabinets, the hospitals, &c. are such appendages as we usually find in an old continental town. There is a bridge of boats over the river, which at Cologne is about 1250 paces wide, connecting the city with the opposite town of Deutz.

⁎ The statistical facts in this notice are from 'Cannabich's Geography,' a late German work.

* This imperial simpleton had made two engagements of marriage before he actually entered into the matrimonial state. In fact he had six wives, like our Henry VIII.

SIMPLIFICATIONS OF ARITHMETICAL RULES.

No. 1.

OUR readers are aware that all or most of the common rules of commercial arithmetic are intended to give exact results, true to the nearest fraction of a farthing, a grain, or an inch, as the case may be; and it is very necessary that it should be so. But it is no less desirable to have other rules, more simple than those of the first class, to enable us to get near the result, when we do not require extreme accuracy. Without enlarging further upon the advantage of such rules, we will proceed to give one, intending in future papers to enter upon others.

Having given the price of one article, we often want to know nearly how much ten, a hundred, or a thousand of the same will cost, at the same rate. Or, knowing how much ten, a hundred, or a thousand will cost, we wish to know the price of one. The rule we are going to give will tell within three-pence how much ten will cost, within two shillings how much a hundred will cost, and within a pound how much a thousand will cost. The reverse rule is much more correct, for when we know how much a thousand cost, we may tell within a farthing how much one will cost. We will explain it by an example, as follows:—

If a gallon costs £3. 17*s*. 7¾*d*., how much will ten, a hundred, and a thousand gallons cost respectively?

1. Write down the pounds, and by the side of them write down the half of the shillings, after which write a 5, if dividing the shillings by 2 gave a remainder, that is, if the shillings were odd in number. In the present instance this gives 385; the pounds 3, half the shillings 8, and 5 because of the remainder. Annex a cipher to this, which gives 3850.

2. Turn the pence and farthings into farthings only, adding 1 if the number of farthings thus obtained be 24 or upwards. In the present instance this gives 32; the number of farthings in 7¾*d*. is 31, and 1 is added because 31 is greater than 24.

3. Add the two last results together, which gives in this instance 3882, the sum of 3850 and 32.

To find the price of ten gallons nearly, annex a cipher to this, and cut off the three last places; this gives

38/820

The 38 is the number of pounds in the price of ten

gallons: to find the shillings and pence, as near as this rule can do it, we must deal with the 820 in such a manner as to reverse the process in (1) and (2); that is, we must ask what number of shillings and pence would have given us 820, if we had done with them what is directed to be done in (1) and (2). The reverse rule is;—

1. Double the first figure, and add 1 if the second figure be 5 or upwards; this is the number of shillings. It is 16 in this instance, since the second figure is not so great as 5.

2. Take away five from the second figure, if that can be done, and with the remainder and the third figure, or with the second and third figures form a number; which number diminish by 1 if it be 25 or upwards. In the present instance this gives simply 20, for the second figure is not so great as 5, nor is 20 so great as 25. If the number had been 887 instead of 820, we should have had 36; the 3 left from the 8 after 5 has been taken away giving 37, which is diminished by 1, because 37 is greater than 25.

3. Turn the last number, considered as farthings, into pence and farthings; which gives, in this case, 5 pence.

Hence the price of ten gallons by our rule is £38. 16*s.* 5*d.* The real price is £38. 16*s.* 5½*d.*

To find the price of a hundred gallons annex two ciphers to 3882 and cut off three places. This gives 388/200, which, treated in the same way, gives £388. 4*s.* 0*d.* The real price is £388. 4*s.* 7*d.*

To find the price of a thousand gallons annex three ciphers to 3882 and cut off three places, or, which is the same thing, annex no ciphers. This gives £3882. 0*s.* 0*d.*; the real price is £3882. 5*s.* 10*d.*

This rule, though it takes some time in the description, may be done after a little practice by the head alone; but with great facility by writing down only as much as is in the following example:—

If 1 gallon costs	£42.	6*s.*	3½*d.*
	42314		
10 gallons cost	£423.	2*s.*	9¾*d.*
100 „	£4231.	8*s.*	0*d.*
1000 „	£42314.	0*s.*	0*d.*

which are respectively too small by 1½*d.*, 14*d.*, and 11*s.* 8*d.*

We write down the following examples, which the reader may verify by the rule:—

If 1 costs	£2.	0*s.*	11½*d.*
10 cost	£20.	9*s.*	5*d.*
100 „	£204.	14*s.*	0*d.*
1000 „	£2047.	0*s.*	0*d.*

In this case, and in that where there is only one shilling, a cipher must be placed after the pounds. Thus the number from which these are deduced is 2047.

If 1 costs	£31.	9*s.*	1¾*d.*
10 cost	£314.	11*s.*	5*d.*
100 „	£3145.	14*s.*	0*d.*
1000 „	£31457.	0*s.*	0*d.*

If 1 costs	£0.	19*s.*	7½*d.*
10 cost	£9.	16*s.*	0*d.*
100 „	£98.	0*s.*	0*d.*
1000 „	£980.	0*s.*	0*d.*

The rule always gives too little, except in the case where the number of pence is exactly 6*d.*, in which case the answer is accurately true. For example,

If 1 costs	£2.	18*s.*	6*d.*
10 cost	£29.	5*s.*	0*d.*
100 „	£292.	10*s.*	0*d.*
1000 „	£2925.	0*s.*	0*d.*

As it is very uncommon, when the price is above five shillings, to sell goods, except for an exact number of shillings and sixpences, this case will be found very convenient.

We may now describe the reverse rule. Knowing how many 10, 100, 1000, &c. cost, convert the sum into one number, by the first rule, strike off three places, and *as many more* as there are ciphers in the number named. For example, if 100 cost £4936. 18*s.* 7¾*d.*, how much does one cost? The number is 4936932, from which I strike off *five* places; viz., the *three* which are struck off in every case, and *two* for the 2 ciphers in 100. This gives

49/36932

Retain only three figures on the right, or

49/369

which gives, treated according to the second rule, £49. 7*s.* 4¾*d.* for the price of one. This is within a farthing of the truth.

We have put the rule in such a way that those who do not understand decimal fractions may avail themselves of it. Those who understand decimals may be told that this process is a short one for converting any number of shillings and pence into the corresponding decimal of a pound. Thus £1 15*s.* 6¾*d.* is £1·778 nearly.

Our coinage might be altered so as to make this rule exact, without altering the quantity of copper which is now coined into a pound sterling. It would require that the copper which now goes to 960 farthings or 240 pence, should be divided into a thousand farthings or 250 pence, the penny being four farthings, as at present. Of these farthings 50 would go to a shilling, instead of 48 as at present; so that the shilling would be twelve-pence halfpenny. This would be inconvenient, but not very much so; and the silver and gold coinage would remain entirely untouched. The difference between the old and new farthing would be only one twenty-fifth part of the old farthing; so that if goods were sold at the same *nominal* price, the loss to the seller would be about a farthing in sixpence; or if the same real price were to be kept, the old price might be turned into the new, with exceeding accuracy, by adding a farthing for every sixpence. This would be very useful in the period of confusion which would elapse between the establishment of the new coinage and the death of the generation which was brought up under the old. It would become usual to sell goods by tens instead of dozens, which would very much facilitate arithmetical operations.

We are not advocates of any such change, but rather the contrary; but we are convinced that if any alteration ever take place, this should be the one.

We will only add that even at present a simple table, small enough to be engraved on wood or bone, which could be carried in the waistcoat pocket, is all that is necessary to work by this rule with perfect exactness to any extent.

THE FOSSIL IGUANODON.

The guana, or iguana, of the West Indies, of which a description and wood-cut were given in a recent number of this Magazine, appears to be the living type or representative of one of the largest and most extraordinary reptiles of a former world that has hitherto been found in a fossil state. The discovery of this animal, and of its structure and character, we owe to the scientific researches of Gideon Mantell, Esq., F.R.S., of Lewes in Sussex; and a detailed account of its osteology, with plates, was given by that gentleman in the Philosophical Transactions, 1825; and subsequently in an interesting work published in 1827, entitled 'Illustrations of the Geology of Tilgate Forest.' From the close resemblance of the bones and teeth to those of the guana, Mr. Mantell has named the fossil animal the iguanodon; but though there is a resemblance in structure between the living and the fossil animal, they differ enormously

in bulk. The living guana seldom exceeds the length of five feet: that of the iguanodon, estimated by the magnitude of the bones, must have been about seventy feet; the circumference of the body fourteen feet and a half; the length of the thigh and leg eight feet two inches; the foot, from the heel to the point of the claw, six feet; the height, from the ground to the top of the head, nine feet. Let the reader refer to the figure of the guana, No. 41, p. 332, and if he can, let him imagine it to be amplified to the dimensions here given, and he will form a better idea of the iguanodon than a verbal description could convey. The bones of the iguanodon are found imbedded in sandstone, in the quarries near Cuckfield in Sussex; they have also been found in similar strata in other parts of the county. In the same quarries are also found the bones of other large saurian or lizard-shaped animals, together with remains of turtles and fresh-water shells. No entire skeleton of the iguanodon has hitherto been discovered; but Mr. Mantell, from his knowledge of comparative anatomy, has been enabled to trace the connection of the different parts in a satisfactory manner. This was a labour of some years; nor was it until several of the teeth were found that he could determine the true character of the animal, which was an herbivorous masticating reptile. On comparing the teeth with those of various species of crocodiles and lizards, he discovered an identity of form with those of the living guana, as may be seen in the annexed drawings, which are correct representations of both. The reader may be surprised to find the teeth of the iguanodon, which are here given of the natural size, to be so apparently disproportionate to the bulk of the animal, but this is the case with the living guana; its length is five feet, but its teeth are not larger than those of mice.

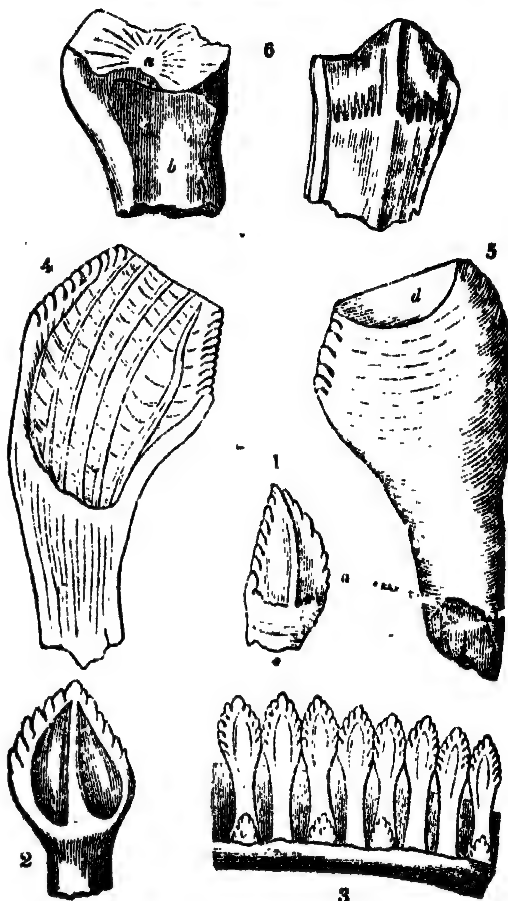
The living guana bites off the buds of vegetables, and swallows them without mastication; but from the worn-down state of some of the teeth, Mr. Mantell is decidedly of opinion that the iguanodon masticated its food: such was also the opinion of Baron Cuvier, who pronounced this animal to be "the most extraordinary creature that had ever been discovered." From the nature of its food it must have been a terrestrial reptile like the guana. The iguanodon, like one species of guana in St. Domingo, (Iguana cornuta,) had a bony protuberance or horn placed near the eyes: a fossil horn has been discovered; it is about the size of the lesser horn of the rhinoceros. The principal bones of the iguanodon collected in Mr. Mantell's Museum at Lewes, are immense vertebræ, ribs, thigh-bones of prodigious size, one measuring twenty-three inches in circumference, bones of the feet and toes, and enormous sharp-pointed claws. Mr. Mantell, describing the thigh-bone of such vast circumference, justly observes, "Were it clothed with muscles and integuments of suitable proportions, where is the living animal with a thigh that could rival this extremity of a lizard of the primitive ages of the world?"

It was for some time believed that the remains of the iguanodon were not to be found beyond the wealds of Sussex and Kent; but recently, teeth nearly resembling those of this animal have been discovered by Dr. Jager in Germany.

During the last summer Mr. Mantell discovered the remains of another species of fossil reptile, less than the iguanodon, but resembling it in part of its structure, though differing from it and from all other known reptiles in other parts. It appears to have had a range of enormous scales or spines upon its back, resembling in form those of the guana, as represented in the drawing of that animal before referred to. Mr. Mantell read a description of the parts of this reptile, and exhibited its remains, at a meeting of the Geological Society in December last. He is now of opinion, that from the dislocated and broken bones being still placed in a [illegible]lation to each other, they must have been injured and subsequently disjointed while covered by muscles and integuments.

From the extreme hardness of the stone in which the bones are imbedded, great skill and care were required in removing the stone. The strata of Tilgate Forest, in which these organic remains are found, contain exclusively the shells of fresh-water animals and terrestrial plants. The chalk, which nearly surrounds the strata of the weald, contains the remains of marine animals only.

[Teeth of the Fossil Iguanodon and of the Guana.]



1. Crown of a tooth of the Iguanodon not worn by use, and in this state closely resembling *fig.* 2.
2. A magnified view of a tooth of the recent Guana.
3. Portion of the upper jaw of the recent Guana, with eight teeth highly magnified.
4. Front vie f a tooth of the Iguanodon, *natural size*, the point worn off by grinding its food.
5. Back view of a similar tooth; the worn surface marked *d*.
6. Front and back view of a tooth of the Iguanodon worn down by use. *a* the worn surface. *b* the cavity formed by the pressure of a new tooth, as in the recent jaw, *fig.* 3, *c*.

A PARTY OF EMIGRANTS TRAVELLING IN AFRICA—(*Concluded from No.* 51).

In the mode described in a former number we travelled for ten days; the features of the country changing from dark jungle to the open champaign, and from that again to the desolate sterility of savage mountain scenery, or of parched and desert plains, scattered over with huge ant hillocks and flocks of springboks. Here and there a solitary farm-house appeared near some permanent fountain, or willow-margined river; and then again the wilderness, though clothed perhaps with verdant pasturage and bedecked with magnificent shrubbery, extended from twenty or thirty miles, without a drop of water. It was consequently uninhabitable except after heavy rains.

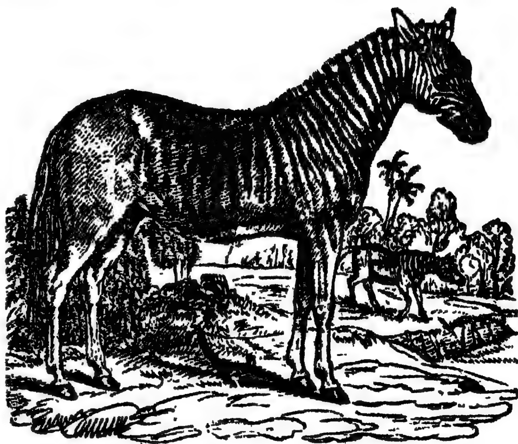
At length we reached Roodewal, a military post on the Great Fish River, 200 miles from Algoa Bay, and about 50 miles distant from the spot allotted for our location. Here we were most hospitably entertained for a couple

of days by the officers of the garrison and their ladies; after which we proceeded on our journey, accompanied by an additional escort of seven or eight armed boors on horseback. Having crossed the Great Fish River, the old boundary of the colony, we entered a region from which the Caffers and Ghonaquas had only been recently expelled; and which was considered as still peculiarly exposed to their predatory inroads. The new colonial frontier had been advanced to the River Keissi, seventy or eighty miles to the eastward; and the intervening territory, now entirely destitute of human inhabitants, was literally "a waste and howling wilderness," occupied only by herds of wild animals,—elephants, buffaloes, quaggas, and antelopes—and by the formidable beasts of prey,—lions, leopards, and hyænas, which are always found when their victims are abundant.

The upper or northern part of this territory consists of a chain of lofty and rugged mountains, partly clothed with forest, and intersected with deep and fertile glens, through which the Kat, the Koonap, the Mancazana, the Baviaan, and other streams issue forth to join the Great Fish River. At the source of the last of these streams, the *Baviaans Rivier*, or River of Baboons, lay the *location*, or allotment, of our little party; distant a hundred miles, at least, from the nearest part of the *English* settlement. Our journey up this glen, from the spot where it issued from the mountains, about twenty miles above Roodewal, occupied five days, and was by far the most arduous portion of our whole expedition. The distance did not exceed thirty English miles; but after we had advanced a short way through a most picturesque defile, which wound, as it were, into the very bowels of the mountains, the road (which thus far was kept in tolerable repair for the conveyance of timber from a magnificent forest on the right) suddenly failed us; and we were literally obliged to hew out our path up the Valley of Baboons, through jungles and gullies, and beds of torrents and rocky acclivities; forming altogether a series of obstructions which it required the utmost exertions of the whole party, and of our experienced African allies, to overcome.

The scenery through which we passed was in many places of the most singular and imposing description. Sometimes the valley widened out, leaving space for fertile savannas along the river side, prettily sprinkled over with shrubbery and clumps of mimosa trees, and clothed with luxuriant pasturage, up to the bellies of our oxen. Frequently, the mountains, again converging, left only a narrow defile, just broad enough for the stream to find a passage; while precipices of naked rock rose abruptly, like the walls of a rampart, to the height of many hundred feet, and in some places appeared absolutely to overhang the savage-looking pass (or *poort*, as the boors called it), through which we and our waggons struggled below; our only path being occasionally the rocky bed of the shallow river itself, encumbered with huge blocks of stone which had fallen from the cliffs, or worn smooth as a marble pavement by the sweep of the torrent floods. At this period the River of Baboons was a mere rill, gurgling gently along its rugged course, or gathered here and there into natural tanks, called in the language of the country *Zeekoe-gats* (hippopotamus pools); but the remains of water-wrack, heaved high on the cliffs, or hanging upon the tall willow trees, which in many places fringed the banks, afforded striking proof that at certain seasons this diminutive rill becomes a mighty and resistless flood. The steep hills on either side often assumed very peculiar and picturesque shapes, embattled, as it were, with natural ramparts of freestone rock; and garrisoned with troops of large baboons, which inhabit these mountains in great numbers. The lower declivities were covered with good pasturage, and sprinkled over with evergreens and acacias; while the cliffs that overhung the river had their wrinkled fronts embellished with various species of succulent plants and flowering aloes. In other spots the freestone or basaltic rocks, partially worn away with the waste of years, had assumed shapes the most singular and grotesque; so that, with a little aid from fancy, one might imagine them the ruins of Hindoo or Egyptian temples, with their half-decayed obelisks, columns, and statues of monster-deities.

It were tedious to relate the difficulties, perils, and adventures, which we encountered in our toilsome march of five days, up this African glen;—to tell of our pioneering labours with the hatchet, the pick-axe, the crow-bar, and the sledge-hammer,—and the lashing the poor oxen, to force them on (sometimes 20 or 30 in one team) through such a track as no English reader can form any adequate conception of. At length, after extraordinary exertions and hair-breadth escapes—the breaking down of two waggons, and the partial damage of others—we got through the last *poort* of the glen, and found ourselves on the summit of a stony ridge, commanding a view of the extremity of the valley. "And now, mynheer," said the Dutch-African field-cornet who commanded our escort, "*daar leg uwe veld*—their lies your country." Looking in the direction where he pointed, we beheld, extending to the northward, a beautiful vale, about six or seven miles in length, and varying from one to two in breadth. It appeared like a verdant basin or *cul de sac*, surrounded on all sides by an amphitheatre of steep and sterile mountains, rising in the back-ground in sharp and serrated ridges of very considerable elevation; their summits being at this season covered with snow, and estimated to be from 6000 to 7000 feet above the level of the sea. The lower declivities were sprinkled over, though somewhat scantily, with grass and bushes. But the bottom of the valley, through which the infant river meandered, presented a warm, pleasant, and secluded aspect; spreading itself into verdant meadows, sheltered and embellished, without being encumbered, with groves of mimosa trees, among which we observed in the distance herds of wild animals—antelopes and quaggas—pasturing in undisturbed quietude.



[The Quagga.]

"Sae that's the lot o' our inheritance, like?" quoth one of the party, a Scottish agriculturist. "Aweel, noo that we've really got till 't, I maun say the place looks no sae muckle amiss, and may suit our purpose no that ill, provided thae haughs turn out to be gude deep land for the pleugh, and we can but contrive to find a decent road out o' this queer hieland glen into the lowlands—like ony Christian country."

Descending into the middle of the valley, we unloaded the waggons and pitched our tents in a grove of mimosas, on the grassy margin of the river; and the next day our armed escort with the train of shattered vehicles set out on their return homeward, leaving us in our wild domain to our own courage and resources.

P.

THE NEW RIVER.

IT was on the 1st of February, in the year 1608, that the cutting of the canal was begun for the admission of the New River, the bountiful source from which the greater part of London is now supplied with one of the first necessaries of existence. For a long period the inhabitants of this metropolis derived the water they required for domestic purposes through the labour of water carriers, who fetched it from the Thames, and from various other open streams, such as the Fleet and its tributaries, which were carried in their natural course towards the hollow in which the city stands. The intrepid drinkers do not seem to have given themselves much concern about the quality of the water, so long as the quantity was sufficient. The Londoners appear to have remained satisfied with their ditches, and with the different wells which were sunk in the gardens of the religious houses and in some other spots; till on the one hand the increase of the city rendered the supply from these sources inadequate, while on the other the covering in of several of the formerly exposed streams, as houses and streets extended in various directions, deprived them of some of their ancient resorts. It was in the year 1236 that water was first brought into the town in leaden pipes from the village of Tyburn (which stood not far from the present Stratford Place, in Oxford Road). Nine conduits, or fountains, which were then erected here, were retained by the city of London till the beginning of the last century. After this first attempt, water was brought in the same manner from Islington, Hackney, Hoxton, and various other places. It was not till towards the end of the sixteenth century that any water was raised by machinery from the Thames. The first work erected for that purpose was the construction of Peter Maurice, a German engineer. The supply obtained in these different ways was distributed to the public by means of conduits, or as Maitland expresses it, "cisterns of lead, castellated with stone," which were raised in the middle of the principal streets. The largest and most ancient of these was that which stood in Westcheap, and which had been erected in the year 1285; but they at last amounted to above twenty in all. Many of these were not taken down till towards the middle of the last century. On the 18th of September, Stow informs us, it was the custom for the Lord Mayor and Aldermen, mounted on horseback, to pay an annual visit to the head conduits at Tyburn; on which occasion they hunted a hare before, and a fox after dinner, in the neighbouring fields.

Notwithstanding, however, the supplies that had been obtained both from the Thames, and from the various other streams in the immediate neighbourhood, a considerable scarcity began to be felt towards the end of the reign of Elizabeth, which increased after her successor came to the throne. This may perhaps have been one of the reasons which produced the series of prohibitions issued about this time against the further extension of the city by new buildings. In these circumstances different projects were suggested; but although an act of parliament was passed granting liberty to the city to make the necessary cut for bringing water from any part of Middlesex or Hertfordshire, no one for some years could be found bold or patriotic enough to engage in the adventure. At last the speculation was undertaken by a public-spirited citizen, Mr. Hugh Myddleton, of whose origin and early history not much more, we believe, is known than that his father, Richard Myddleton, had from the reign of Edward VI. been Governor of Denbigh Castle. He himself had followed the business of a goldsmith; but had amassed his fortune principally by some Welsh mines which he had taken a lease of and worked. The city having transferred to him all the powers, rights, and privileges conferred by the act, he prepared to cut his canal from the height immediately north of London to the rivers Chadwell and Amwell, near Ware, in Hertfordshire,—a track of nearly forty miles in length. We cannot enter into a detail of the numerous obstacles of various kinds in the face of which this gigantic enterprise was prosecuted and finally accomplished. In addition to the difficulties arising from the nature of the ground, which presented great diversity of bottom as well as of level, others of a still more formidable and discouraging nature soon began to beset the progress of the undertaking. The envy of some, and the contempt and ridicule of others, aided the opposition by which interested and influential parties were enabled, under pretence of the public good, to seek their own ends. Then, worst of all, came the deficiency of Myddleton's means; the expense of the works turned out so much greater than he had anticipated, that long before it was brought to a close it had swallowed up the whole of his large fortune. He was obliged to crave the assistance both of the King and of the city. It is said that the whole sum which he expended did not fall short of five hundred thousand pounds. At this cost, however, the work was at last finished in the autumn of 1613. On Michaelmas that year, the day on which Sir Thomas Myddleton, Mr. Myddleton's brother, was elected Lord Mayor, the water was admitted into the basin at Pentonville, with much form and ceremony, in the presence of the Lord Mayor then in office, the Aldermen, the Recorder, and many of the principal citizens. A body of about sixty of the labourers, tastefully dressed, having marched three times round the basin, preceded by drums and trumpets, the whole then stopped, when one of their number addressed the civic dignitaries and the company, who were seated on an eminence, in a rude metrical effusion of considerable length, which Stow has preserved, but of which we can only afford to quote a very few lines:—

> "Clerk of the work, reach me the book, to show
> How many arts from such a labour flow.
> First, here's the Overseer, this tried man,
> An ancient soldier, and an artizan;
> The Clerk next him, a mathematician.
> The Master of the Timber-work takes place
> Next after these; the Measurer in like case;
> Bricklayer and Engineer; and after those
> The Borer and the Paviour; then it shows
> The Labourers next; Keeper of Amwell Head;
> The Walkers last; so all their names are read.
> Yet these but parcels of six hundred more,
> That at one time have been employed before."

On the conclusion of this address, the sluices were opened, and amidst the sound of drums and trumpets, the discharge of ordnance, and the acclamations of the multitude, the water rushed into the basin, which it has never since ceased to fill.

It is lamentable to reflect that Myddleton was entirely ruined by this speculation. This misfortune befell him, notwithstanding that the King resigned to him the share, being one half, of the profits to which he was entitled by their agreement, retaining only the right to an annual payment of £500. The value of the shares thus relinquished, which are called the King's shares, still remains somewhat lower in the market than that of the others, or the Adventurers' shares, in consequence of each holder being burdened with his proportion of this payment. Myddleton was knighted soon after the completion of his great work, and he was made a baronet in 1622. He was now, however, obliged to support himself by taking employment as an engineer. He died in 1631 in poor circumstances; and not long ago some of the descendants of this great national benefactor were found in a state of such destitution as to call for an appeal in their behalf to the charity of the public.

The undertaking, however, which thus brought ruin upon the man by whom it was projected and executed, has formed the source of great wealth to many other individuals. To the inhabitants of London and its vicinity in general, the New River has proved a blessing of incalculable magnitude. According to the

report of a commission appointed under the great seal, in 1828, the number of tenants supplied by the New River Company was then between 66,000 and 67,000, and the quantity of water daily supplied exceeded 13,000,000 gallons, being about 2,000,000 cubic feet. This was a quantity rather exceeding the whole of that supplied by the other four water companies, the East London, the West Middlesex, the Chelsea, and the Grand Junction, upon which the northern portion of the metropolis is dependent. Even including the large districts of Southwark and Lambeth, which are served by the Lambeth, the South London, and the Southwark works, the whole quantity consumed daily was about 29,000,000 gallons, or 4,650,000 cubic feet, not a great deal more than twice that supplied by the New River alone. The whole quantity of 29,000,000 gallons of water, daily supplied to the inhabitants of London, is distributed to about 125,000 houses and other buildings, which is at the rate of above 200 gallons every day to each house. The average cost to each house for this wonderful supply is about two-pence a day; which is a less price than the labour of an able-bodied man would be worth to fetch a single bucket from a spring half a mile from his own dwelling.

The following extract from Dr. Arnott's Elements of Physics well explains the general nature of the arrangements by which this immense distribution is effected, and places in a striking light the inestimable importance of the blessing which London thus enjoys:—

"The supply and distribution of water in a large city, particularly since the steam-engine has been added to the apparatus, approaches closely to the perfection of nature's own work in the circulation of blood through the animal body. From the great pumps, or a high reservoir, a few main pipes issue to the chief divisions of the town; these send suitable branches to the streets, which branches again divide for the lanes and alleys; and at last subdivide until into every house a small leaden conduit rises, which, if required, carries its precious freight into the separate apartments, and yields it there to the turning of a cock. A corresponding arrangement of drains and sewers, most carefully constructed in obedience to the law of level, receives the water again when it has answered its purposes, and carries it to be purified in the great laboratory of the ocean. And so admirably complete and perfect is this counter-system of sloping channels, that a heavy shower may fall, and, after washing and purifying every superficial spot of the city, and sweeping out all the subterranean passages, may, within the space of an hour, be all collected again in the river passing by. It is the recurrence of this almost miracle, of extensive, sudden, and perfect purification, which has made London the most healthy, while it is the largest city in the world. English citizens have now become so habituated to the blessing of a supply of pure water, more than sufficient for all their purposes, that it no more surprises them than the regularly returning light of day or warmth of summer. But a retrospect into past times may still awaken them to a sense of their obligation to advancing art. How much of the anxiety and labour of men in former times had relation to the supply of this precious element! How often, formerly, has periodical pestilence arisen from deficiency of water, and how often has fire devoured whole cities, which a timely supply of water might have saved! For these reasons kings have received almost divine honours for constructing aqueducts, to lead the pure streams from the mountains into the peopled towns. In the present day, only he who has travelled on the sandy plains of Asia or Africa, where a well is more prized than mines of gold, or who has spent months on ship-board, where the fresh water is doled out with more caution than the most precious product of the still, or who has vividly sympathized with the victims of siege or ship-wreck, spreading out their garments to catch the rain from heaven, and then, with mad eagerness, sucking the delicious moisture—only he can appreciate fully the blessing of that abundant supply which most of us now so thoughtlessly enjoy." The author will long remember the intense momentary regret with which, on once approaching a beautiful land, after months spent at sea, he saw a little stream of fresh water sliding over a rock into the salt waves—it appeared to him as a most precious essence, by some accident pouring out to waste."

THE DESTRUCTION OF SENNACHERIB.

The Assyrian came down like the wolf on the fold,
And his cohorts were gleaming in purple and gold;
And the sheen of their spears was like stars on the sea!
When the blue wave rolls nightly on deep Galilee.

Like the leaves of the forest when summer is green,
That host with their banners at sunset were seen:
Like the leaves of the forest when autumn hath blown,
That host on the morrow lay wither'd and strown.

For the angel of death spread his wings on the blast,
And breathed in the face of the foe as he pass'd;
And the eyes of the sleepers wax'd deadly and chill,
And their hearts but once heav'd, and for ever grew still.

And there lay the steed with his nostril all wide,
But through it there roll'd not the breath of his pride:
And the foam of his gasping lay white on the turf,
And cold, as the spray of the rock-beating surf.

And there lay the rider distorted and pale,
With the dew on his brow and the rust on his mail;—
And the tents were all silent, the banners alone,
The lances unlifted, the trumpet unblown.

And the widows of Ashur are loud in their wail,
And the idols are broke in the temple of Baal;
And the might of the Gentile, unsmote by the sword,
Hath melted like snow in the glance of the Lord!

Byron.

MOZART.

The 27th of January is the anniversary of the birth of a wonderful being, the great musician Mozart. John Chrysostom Wolfgang Theophilus Mozart was the son of Leopold Mozart, one of the musicians belonging to the chapel of the Prince Archbishop of Saltzburg, in which town he was born in 1756. He, and a sister four years older than himself, alone of a family of seven children survived the years of infancy. His father and mother were both remarkable for their good looks,—an advantage which their son did not inherit. But he was almost from the cradle a prodigy of musical genius. He was only three years old when his attention was excited in the most extraordinary manner by the lessons which his father then began to give his sister on the harpsichord; and in another year he was rapidly learning to play minuets and other pieces of music himself. At the age of five, he composed numerous pieces, which his father wrote down. Music now became the child's only passion; the society of his little playmates was abandoned; he would have willingly remained at his harpsichord almost from morning to night. Soon after this, his father determined to exhibit him at the different German courts. In the autumn of 1762, accordingly, the whole family proceeded to Vienna. Here the boy played before the Emperor Francis I., when his performance excited the utmost astonishment among some of the first proficients in the art. It was with reluctance, indeed, that he would consent to play except to those whom he believed to be judges of music. When he first sat down to his instrument with the Emperor by his side, "Is not M. Wagenseil here?" he said, addressing himself to his Majesty; "we must send for him; he understands the thing." That composer was accordingly brought forward to occupy the place of the Emperor; and he turned over the leaves of one of his own concertos, while the piece was executed by his young brother artist. Soon after this Mozart learned, nearly without instruction, to play on the violin. Next year he visited in succession Munich, Augsburg, Mannheim, Francfort, Coblentz, Brussels, and lastly Paris; in all of which cities his performances were listened to with universal delight and wonder. Nor did he produce less effect when, in April 1764, he made his appearance in England. After playing the organ in the Royal Chapel, he and his sister gave a grand concert, all the symphonies of which were of his own composition. "Notwithstanding their continual removals," says his Life by M. Schlictegroll, "they practised with the greatest regularity, and Wolfgang began to sing diffi-

cult airs, which he executed with great expression. The incredulous, at Paris and at London, had put him to the trial with various difficult pieces of Bach, Handel, and other masters; he played them immediately, at first sight, and with the greatest possible correctness. He played one day, before the King of England, a piece full of melody, from the bass only. At another time, Christian Bach, the Queen's music-master, took little Mozart between his knees, and played a few bars. Mozart then continued, and they thus played alternately a whole sonata, with such precision, that those who did not see them thought it was executed by the same person. During his residence in England, that is, when he was eight years old, Wolfgang composed six sonatas, which were engraved at London, and dedicated to the Queen."

He remained in this country till July, 1765, and then returning to the Continent, made a tour through the principal towns of the Low Countries. After this he revisited Paris, and thence proceeded by the way of Lyons and Switzerland to his native place, which he reached in November, 1766. He remained at home, assiduously engaged in the practice of his art, for above three years At length, in December 1769, he set out for Italy. Though he had now reached his fourteenth year, the additional skill he had acquired more than compensated for any diminution of the wonder that had at first been excited by his extreme youth. He was now a perfectly accomplished musician; and his performances, being in themselves nearly all that the most refined taste and science could desire, required no tale of the marvellous to set them off. After visiting Milan, Bologna, and Florence, he reached Rome in the Passion week. Here he performed the surprising feat of memory of taking down, after hearing it in the Sistine chapel, the famous Miserere of Gregorio Allegri, of which the performers of the chapel are said to have been forbidden to give a copy, on pain of excommunication. A second opportunity of hearing it played a few days after, enabled Mozart, who held his first sketch in the crown of his hat, to make his copy more perfectly correct; and next year the music was published in London, under the superintendence of Dr. Burney. His progress through this land of music was a continued triumph. While he was playing at Naples, the audience suddenly took it into their heads that a ring which he wore on his finger was a talisman, and interrupted the performance until he consented to lay it aside, and to convince them that he was not indebted to the art of magic for his wonderful power. Returning to Milan, he there produced his first opera, the 'Mithridate.' It was played for twenty nights in succession. For some succeeding years his time was principally spent at Saltzburg, with occasional visits to Milan, Munich, and Vienna. At last, in September 1777, he proceeded in company with his mother to Paris, with the intention of making that capital their residence. But soon after their arrival, his mother, to whom he was tenderly attached, died; and that event, added to the strong contempt with which he regarded the then prevailing musical style of the French, determined him to return to his father. He left Saltzburg again in November, 1779, for Vienna; and in this capital he remained till the close of his life. Here, at the age of twenty-five, he married Mademoiselle Constance Weber, who proved to him one of the best of wives; and it was in the first glow of his passion for this lady, that he composed his celebrated opera of 'Idomeneo,' which he always regarded as the greatest of his works. After this he wrote his 'Zauberflöte,' his 'Nozze di Figaro,' his 'Don Giovanni,' and his 'Clemenza di Tito,' which all rank among the noblest triumphs of musical genius.

Mozart's last work was his celebrated 'Requiem,' which was undertaken at the order of a stranger. The circumstances under which he received this commission being somewhat mysterious, as related by the German biographer already quoted, are said to have had an unfavourable influence on his spirits and health. The fact is certain, that while in a very weak and sickly state, he applied himself with great ardour to the composition of this Requiem. While thus employed, he was seized with the most alarming fainting fits; but the work was persisted in and completed before his death, which took place on the 5th December, 1792, when he had not completed his thirty-seventh year.



[Portrait of Mozart.]

Infant Asylums.—It is deserving of attention, that, in dependently of schools for the elementary instruction of children above the age of six, in the Duchy of Saxe Weimar, every village contains a district asylum for the reception of children below that age, who have hitherto been left without any superintendence at home, whilst their parents were absent at their work. This abandonment has been, and notoriously is, the prolific source of idle and vagabond habits, which it is extremely difficult to eradicate in after years. The asylums in question have, therefore, been opened for the purpose of remedying this crying evil; the parents send their children to them in the morning, and fetch them home in the evening. In the interim they are fed and taken care of, besides being taught to read and say their prayers. There is not a single village in the whole Grand-duchy, which is not provided with one of these excellent '*Asylum Schools*,' as they are termed; and they are rapidly spreading all over Germany.—*Quarterly Journal of Education, No. IX.*

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YORK MINSTER



[West Front of York Minster.]

The term, *Minster*, which was used by our Saxon ancestors, is a corruption of the Latin *Monasterium*, a house tenanted by monks, or what we still call a monastery. Minster, however, is now generally used to designate a cathedral church, to which it was no doubt originally applied with a reference to the retinue of religious persons forming the chapter of each of these establishments, and giving it the appearance of a monastic community. In this way we still speak of York Minster, and West-minster,—the latter name having been at first given, not to the city in which the church of St. Peter stands, but to the church itself,

to distinguish it from the other minster of St. Paul's in the east; although, forgetting this, we now say Westminster *Abbey*, with the same sort of tautology, or repetition, which we employ when we call the residence of the Lord Mayor the Mansion House, as if a mansion were not in fact a house. Many such irregularities have insinuated themselves into our own, and probably into every other language.

Among buildings in what is called the Gothic style, York Minster has generally been regarded as without a rival in England, or perhaps in Europe. The city, of which it is the chief ornament, has been famous in this island from the most ancient times. Under the name of Eboracum, it appears to have been one of the principal settlements of the Romans. Here the Emperor Severus died in the beginning of the third century, and the Emperor Constantius, the father of Constantine the Great, in the beginning of the fourth. In the times of the Saxons, it was the capital of the kingdom of Deira, and afterwards of the powerful kingdom of Northumberland, formed from the union of Deira and Bernicia, and occasionally enjoying the pre-eminence both in power and in acknowledged rank over all the other states of the heptarchy. Our old historians maintain that York was the seat of a Christian bishopric long before the arrival of the Saxons; and they mention three or four prelates who, they pretend, occupied the see in succession after its foundation by the British king Lucius, who flourished in the second century. But very little dependence can be placed upon these traditions; and it is even doubtful if such a prince as Lucius ever existed. The establishment of the present see of York dates from a considerably more recent era. Augustine, the apostle of the English, arrived in the Isle of Thanet, which formed part of the kingdom of Kent, in the year 597. He was soon after consecrated Archbishop of Canterbury, and, according to the generally received account, died in 605. Kent, however, was as yet, and for some time after, the only portion of the island into which the light of the Gospel had penetrated. Pope Gregory, indeed, by whom Augustine and his companions had been deputed, had commanded that an archbishop should be established at York, to exercise the same jurisdiction over the northern parts of the country as Augustine was authorized to exercise over the south. But it was not till the year 624 that any attempt even seems to have been made to introduce Christianity into the northern district. In that year, Edwin, the able and powerful king of Northumberland, married Ethelburga, the sister of Ebald, king of Kent, a convert, like the rest of her family, to the new religion, and a lady of great worth and piety. It was with extreme reluctance that this princess was prevailed upon to give her hand to her idolatrous suitor, although Edwin was accounted the sovereign of the heptarchy; nor would she consent to marry him, until he had promised to allow her the free exercise of her religion, and the company of such ecclesiastics as she chose to take along with her. Among these was Paulinus, one of the original associates of Augustine, who, before he set out for his new residence, was consecrated Bishop of the Northumbrians by Justus, then Archbishop of Canterbury. Paulinus, however, for some time made very little progress in the work of conversion which he had thus undertaken. Neither his eloquence nor that of Ethelburga could prevail upon Edwin to forsake the faith of his fathers; and, till their king should lead the way, very few of the people were disposed to give heed to any thing that was addressed to them on the subject. At length the conversion of the king was effected through the influence upon his mind of a vision, or dream, which gave a miraculous kind of interest to the exhortations of Paulinus. Bede, the ecclesiastical historian, has related this circumstance with minute particularity. The baptism of Edwin gave occasion to the erection of the first Christian temple at York—the original mother of the present cathedral. The ceremony was performed on Easter-day, the 12th of April, 627, in a wooden building which was hastily raised, and placed, it is said, on the same spot on which the Minster now stands. But soon after Edwin took down this temporary structure, and commenced the erection of a new church of stone, which however he did not live to complete, having been slain in a great battle fought at Hatfield in the West Riding, in 633, against Penda, king of Mercia, aided by Cadwalla, the British king of Wales. Paulinus left his diocese on the occurrence of this disastrous catastrophe, and was afterwards appointed Bishop of Rochester. After some time, however, tranquillity was in some degree restored in Northumberland, and the building of the church begun by Edwin was carried on by one of his successors, Oswald, a son of his uncle Adelfrid. But it was not completed till long after his death, by Wilfrid, the archbishop of the see, a most haughty and turbulent prelate, whose history presents a very curious picture of the English Church in those remote times. The edifice, thus at last brought to a close, is described as having been of a square, or at least of a rectangular form, and was probably very plain, as were all the buildings of that age. It did not stand long, having been burnt to the ground by an accidental fire in 741. It was soon after rebuilt; but in 1069 it was a second time reduced to ruins in a similar manner; the Norman garrison who occupied the city while it was besieged by the insurgent population of the surrounding country, having, in order to drive away the enemy, set fire to a part of the suburbs, from which the flames overspread and laid waste near half the city. On this occasion there perished a famous library which was deposited in the cathedral, collected by Archbishop Egbert, who possessed the see from 730 till 736. Of this library Charlemagne's preceptor, the celebrated Alcuin, who received his education at York, speaks both in his letters and poems in terms of the highest admiration, enumerating in one place a long list of authors contained in it, some of which are now no longer extant. The year after this event the Conqueror appointed to the see of York, Thomas, a canon of Bayeux in Normandy, who had been his chaplain and treasurer; and the new prelate was not long in setting about the restoration of his metropolitan church. He rebuilt it on a larger scale than before, and for the first time formed the establishment into a regular chapter, endowing it with prebends and other dignities. The fabric, however, was again accidentally burnt down, in 1137, along with the greater part of the city. In 1171 Roger de Bishopsbridge, who was archbishop from 1154 till 1181, again began a new edifice by the erection of a choir, where that of the present building now stands. But, as we shall presently see, no part of Archbishop Roger's work remains in the existing cathedral.

The choir being completed by this prelate, one of his successors, Archbishop Walter de Grey, commenced the building of the south part of the cross aisle or transept about 1227. The north transept was erected by John le Romayne, treasurer of the cathedral, about 1260. Over the centre of the whole he raised a steeple, but not the noble lantern tower which now occupies that position. The first stone of the nave, or body of the church, to the west of the transept, was laid by his son, the archbishop of the same name, on the 7th of April, 1291; and the nave was finished, as well as the two towers which crown its western extremity, in 1330, in the prelacy of William de Melton. The building, therefore, was now once more complete; but the comparative plainness of the more ancient portions of it being felt to suit ill with the magnificence of those last erected, Archbishop John de Thoresby, who came to the see in 1354, determined to take down the choir of his predecessor, Archbishop Roger, and to replace it by another more in

harmony with the rest of the structure. He commenced this great work in 1375; but it is not perfectly certain when it was finished, some parts of the choir exhibiting the arms of Archbishops Scrope and Bowet, Thoresby's successors, the latter of whom succeeded to the see in 1405. Meanwhile, it had also been resolved to take down the central steeple erected by John le Romayne; and in its place the present lantern tower was begun to be built in 1370. The whole was probably finished, and the Minster brought to the state in which we now see it, about 1410 or 1412.

From this account it appears that the successive parts of the building, in the order of their antiquity, are the south transept, the north transept, the nave, the central tower, and, lastly, the choir, proceeding from the west end to the east. Reviewed in this order the Cathedral of York forms a most interesting and instructive architectural study. It is perhaps the most perfect example to be any where found of the history and progress of the Gothic style during the period of not much less than two centuries, which its construction occupied. In this place we can only remark generally, that a continued and regular improvement in grace and lightness of form, and a more and more lavish profusion of minute and elaborate ornament, will be found to form the leading characteristics of that progress in England, during the whole of the period in question.

York Minster, as may be understood from what has been already stated, is built in the form of a cross, the longer bar, forming the choir and nave of the church, lying, as usual, east and west, and the shorter, called the transept, north and south. Over the centre of the building, supported on four massive pillars, rises a grand tower to the height of 213 feet from the floor. This is said to be only a portion of the altitude originally designed by the architect, who intended to surmount this stone erection by a steeple of wood covered with lead, had he not been deterred by a fear lest the foundation should prove insufficient to sustain so great a weight. Over the west end of the building are two other towers or steeples rising to the height of 196 feet. The whole length of the building from east to west is 524½ feet, and that of the transept, from north to south, 222. The length of the choir is 157½ feet, and its breadth 46½; in addition to which the east end of the choir contains a chapel behind the altar dedicated to the Virgin, making an entire length of 222 feet. The length of the nave is 261 feet; its breadth (including the aisles), 109; and its height, 99. These measurements (with the exception of the height of the towers at the west end, which is not given in that work) are taken from the last edition of Dugdale's Monasticon Anglicanum, by Caley, Ellis, and Bandinel, in 6 vols. folio, London, 1830.

York Minster has not the advantage of standing upon a height; yet its enormous mass makes it a conspicuous object from a great distance, and nothing can be grander or more imposing than the aspect which its lofty buttresses and grey towers present as they are seen rising over the surrounding houses of the city, which look like the structures of a more pigmy generation beneath the gigantic and venerable pile. Excepting on the north side where an open space of considerable extent has been formed by clearing away the old archiepiscopal palace, it is every where closely encompassed by other buildings, several of which approach within a few yards of its walls. There is scarcely, therefore, a spot from which any one of its fronts can be completely or satisfactorily seen; except from a distance, where of course only the upper parts of the building are visible. The formation of a large open square around the noble old edifice, so that the whole might be viewed as perfectly as the north side, would exhibit the gigantic pile in all its surpassing magnificence. For the present the grandeur of the Minster must be sought for principally in its interior. The effect of the whole prolonged and lofty extent, as seen on entering from the great west door, is perhaps as sublime as any ever produced by architecture. Under favourable circumstances, such as the rich illumination of a setting sun, the impressions of awe, and veneration, and we may add delight, produced upon the mind by the grandeur and beauty of this wonderful building, are perhaps superior in intensity to the effects of any other work of man's hands. We doubt whether the finest Grecian temple could ever so touch the hidden springs of enthusiasm in our nature. The choir is divided from the nave by a stone screen; but this ornamental partition is so low as not to intercept the view of the portion of the roof beyond, nor "the dim religious light" streaming from the magnificent "storied window" that fills the east end of the building. This screen and the great east window are two of the proudest ornaments of the cathedral. The former is a work in the very richest style of ornamental carving; and fortunately it is in almost perfect preservation. It is divided into compartments by fifteen niches, which contain the statues of the English kings from the Conqueror to Henry VI. inclusive. The place of the last-mentioned monarch used to be occupied by a figure of James I., which it is said was substituted for that of Henry, after the latter had been displaced in consequence of the disposition manifested by the people to pay it a sort of idolatrous reverence, in memory of the holy king. It seems to have been thought there was no danger of their falling into the same excess of observance towards James's effigy. James, however, was not many years ago taken down from a situation where he was certainly out of place, and a new statue of Henry, carved by a York sculptor, put in the niche. The great east window is of the vast dimensions of 75 feet in height by 32 in breadth. It is formed of above 200 compartments of painted glass. According to Mr. Britton, in his 'Cathedral Antiquities,' the figures are generally from two feet two, to two feet four inches in height. The heads in particular are many of them drawn with exquisite beauty. The fabrication of this noble specimen of art was begun in 1405, by John Thornton, of Coventry, whose agreement was to complete it in three years, during which time he was to have a salary of four shillings a week, with 100 shillings additional per annum, and £10 more on finishing the work, if it should be done to the satisfaction of his employers.

Attached to the northern transept of the cathedral is the Chapter House, an octagonal building, with a conical roof, the interior of which consists of one apartment of great magnificence. It is 63 feet in diameter and 67 feet 10 inches in height, the arched roof being supported without pillars. Around are arranged the stalls, forty-four in number, formed of the finest marble, and having their canopies sustained by slender columns. A window occupies each of the eight sides, except that in which is the entry from the transept.

York Minster contains a good many tombs, some of them of considerable beauty; but these we cannot here attempt to describe. Among the curiosities preserved in the vestry we can notice only the ancient chair, said to have been used at the coronation of some of the Saxon kings, and on which the Archbishop is still on certain occasions accustomed to seat himself; and the famous horn of Ulphus, one of the most curious relics of Saxon antiquity which have been preserved to our times. A learned dissertation respecting this horn, by Mr. Samuel Gale, may be found in the first volume of the 'Archæologia.' It was presented to the cathedral by Ulphus, a Lord of Deira, whose drinking horn it probably had been, along with and in testimony and confirmation of a grant of certain lands, still said to be in possession of the Chapter, and known by the name of the *Terra Ulphi*. They lie a short distance to the east of the city. The horn, which is in perfect preservation, is of ivory, and among other sculpture on the outside is ornamented

with figures of two griffins, a lion, a unicorn, and some dogs and trees cut in bas-relief. Mr. Gale is of opinion that it was probably presented by Ulphus soon after the death of King Canute, which took place, A.D. 1036. The horn was carried away at the time of the Reformation; but long after fell into the hands of the celebrated Thomas Lord Fairfax, by whose son Henry it was restored to the cathedral in 1675

York Minster, it will be recollected, was very nearly destroyed, on the 2d of February, 1829, by the act of an insane individual, Jonathan Martin, who, having concealed himself in the choir after service the preceding evening, contrived to kindle a fire in that part of the building, which was not discovered till seven o'clock in the morning. By this time the wood-work of the choir was every where in a blaze; but by great exertions, and especially by sawing through the beams of the roof, and allowing it to fall upon the flames below, the conflagration was in a few hours subdued. The damage done consisted in the entire destruction of the stalls of the choir, and of the 222 feet of roof by which that part of the building was covered. The organ over the screen was also destroyed, but the screen itself escaped uninjured. A public subscription was immediately commenced for the repair of a loss which was justly considered a national one, and the sum of £50,000 was collected within two months. The task of effecting the restoration was committed to Mr. Smirke; and the work was admirably completed in the spring of the present year. The scrupulous care with which the restoration has been accomplished, so as to preserve every detail of the building, is highly creditable to the architect and his employers. The roof has been executed in teak, and the carved work of the choir in oak. With the exception that the choir looks cleaner and fresher than formerly, a person unacquainted with its destruction would be unable to perceive any change. The organ, one of the finest in Europe, was destroyed; and another is being erected in its place. Even in an unfinished state this appears to be a grand instrument; and well calculated for those fine choral services, which are heard with more effect in York Minster than in any other cathedral.



[Interior of the Choir of York Minster.]

WHITE'S NATURAL HISTORY OF SELBORNE.

NEARLY fifty years ago the book which bears the above title was first published. It was a modest and unpretending octavo volume, which did not aspire to any general popularity, and for a long time was known to few but professed naturalists. A quarto edition, including 'The Antiquities of Selborne,' afterwards appeared. "The Natural History of Selborne," says the author of the Menageries, "was written by the Rev. Gilbert White, who for forty years scarcely stirred from the seclusion of his native village, employing his time, most innocently and happily for himself, and most instructively for the world, in the observation and description of the domestic animals, the birds, and the insects by which he was sur-

rounded. He does not raise our wonder by stories of the crafty tiger or the sagacious elephant; but he notes down the movements of 'the old family tortoise;' is not indifferent to the reason 'why wagtails run round cows when feeding in moist pastures;' and watches the congregating and disappearance of swallows with an industry which could alone determine the long-disputed question of their migration. Mr. White derived great pleasure from these pursuits, because they opened to his mind new fields of inquiry, and led him to perceive that what appears accidental in the habits of the animal world, is the result of some unerring instinct, or some singular exercise of the perceptive powers, affording the most striking objects of contemplation to a philosophic mind."

It is this accuracy of observation, combined with a cheerful, benevolent, and pious spirit, which has at length rendered the Natural History of Selborne a book for all. Though its details have immediate reference to an obscure hamlet on the borders of a barren heath in Hampshire, the subjects of which it treats are common to every district, and are consequently of universal interest. The work, therefore, has been very properly reprinted, within the last year or two, in several forms. There is a cheap edition in Constable's Miscellany; and a library edition, containing the Antiquities of Selborne, some very interesting notes by naturalists of the present day, and many well-executed wood-cuts, has just appeared*. The wood-cuts are to our minds extremely pleasing. We have a view of the low-roofed hall, with its massive chimneys and squat gables, in which the happy old clergyman resided,—as well as several others of the sequestered village, and adjacent lanes and dingles, where he delighted to watch the movements of the birds and insects, with whom he cultivated the most intimate companionship. There is nothing particularly striking in these scenes, but they are thoroughly English; and above all they are such as the greater part of our rural population dwell amongst, showing to us that Mr. White had no peculiar opportunities for those delightful pursuits, which in his case, to use his own words, "by keeping the mind and body employed, under Providence contributed to much health and cheerfulness of spirits, even to old age." Wherever there is a tree, or a green sward, or even a road-side hedge, there may be found as abundant materials for the observation of nature, as Mr. White possessed; who, as is well observed in the preface to the edition before us, although "distant from museums and collections, acquired a knowledge of animals so extensive and so accurate as to outstrip most of his contemporaries who possessed much greater advantages."

It is difficult to select a detached passage from the Natural History of Selborne that may give a proper idea of the merits of this delightful book. Nor is it necessary that we should do so; for the work itself ought to form a part of every library, and is one which we would especially recommend to all those who unite for the purchase of standard books. The notes, however, of this new octavo edition contain many valuable facts; and we shall make a few extracts from these, which we doubt not will be gratifying to our readers.

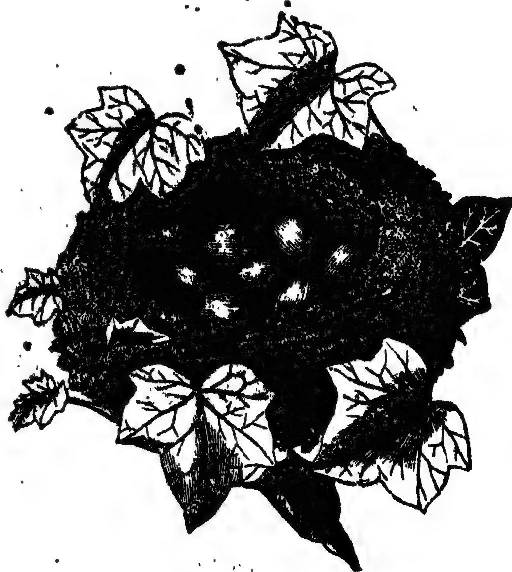
Mr. White has an observation which might lead one to think that the tree-frog was a noxious reptile. Upon this passage Professor Rennie has the following remark. We subjoin a wood-cut of the tree-frog:—

From the way in which Mr. White speaks of the tree-frog (*Hyla vulgaris*), it might be inferred that he thought it was possessed of injurious qualities, whereas a more innocent creature does not exist; and it is besides so little, and of so beautiful a green, that it is a very common pet in Germany. My friend, J. C. Loudon, Esq., the well-known author of the Encyclopædia of Gardening, kept one for several years; and in the autumn of 1830 I caught one sitting on a bramble at Cape La Hève, on the coast of Normandy, which I kept for many weeks, but it finally escaped from me between Bayswater and Hyde Park Corner, by the gauze covering of its glass accidentally slipping off before I was aware. From La Hève being nearly opposite the Isle of Wight, I think it not improbable that the tree-frog may be found in the south of England; though it may escape notice by its smallness, and by its colour being so like that of the leaves of the trees which it frequents. The peasants at La Hève had never seen one before I showed them mine.



[The Tree frog.]

In a work published a few years ago, 'The Journal of a Naturalist,' which is written in the same spirit of careful attention to common objects as presides over the History of Selborne, there is an observation which is at variance with a note by the Hon. and Rev. W. H. Herbert, which we shall presently give. Mr. Knapp (the author of the Journal of a Naturalist) says—"The golden-crested wren, a minute creature, *perfectly unmindful of any severity in our winter*, and which hatches its young in June, the warmer portion of our year, yet builds its most beautiful nest with the utmost attention to warmth."



[Nest of the Golden-crested Wren.]

* The Natural History and Antiquities of Selborne, by the late Rev. Gilbert White. A new edition, with notes, by several eminent Naturalists, &c. 8vo. 16s.

It certainly appears consonant with the general instinct of birds, that those species which are most affected by cold, should build the warmest nests; and in our variable climate the frosts even of the advanced spring might otherwise destroy the callow brood. If the golden-crested wren were a hardy bird, it is probable that its nest would be of slight texture. The note before us states the contrary to be the fact.

The golden-crested wren and the common brown wren are both *very impatient of cold.* In confinement, the least frost is immediately fatal to them. In a wild state, they keep themselves warm by constant active motion in the day, and at night they secrete themselves in places where the frost cannot reach them; but I apprehend that numbers do perish in severe winters. I once caught half a dozen golden wrens at the beginning of winter, and they lived extremely well upon egg and meat, being exceedingly tame. At roosting time there was always a whimsical conflict amongst them for the inside places as being the warmest, which ended of course by the weakest going to the wall. The scene began with a low whistling call amongst them to roost, and the two birds on the extreme right and left flew on the backs of those in the centre, and squeezed themselves into the middle. A fresh couple from the flanks immediately renewed the attack upon the centre, and the conflict continued till the light began to fail them. A severe frost in February killed all but one of them in one night, though in a furnished drawing-room. The survivor was preserved in a little cage by burying it every night under the sofa cushions; but having been, one sharp morning, taken from under them before the room was sufficiently warmed by the fire, though perfectly well when removed, it was dead in ten minutes. The nightingale is not much more tender of cold than a canary-bird. The golden-crowned wren very much frequents spruce fir trees and cedars, and hangs its nest under their branches: it is also fond of the neighbourhood of furze bushes, under which it probably finds warm refuge from the cold. The brown wren is very apt, in frosty weather, to roost in cow-houses where the cattle keep it warm.

The following anecdote of a *yellow wren,* who had been reared in confinement, and did not forget his benefactor even after he had migrated to far-off lands (for the yellow wren is a bird of passage), is also given by Mr. Herbert:—

Last year I had reared three cocks from the nest, and in July I wished to set one of them at liberty. Having let it out of the cage which stood near a window which was opened, it continued for a long time hopping and flying about the top of the cage, and sitting upon the pots upon the ledge, and on a bar to which the roses were tied across the window. At last it began to travel up the creepers against the house, and getting upon the roof it flew over the buildings, and I did not expect to see it again; but two hours after it returned exceedingly hungry, and lit upon the upper bar of the middle pane of the lower sash of the same window, and pecked hard for admittance. It was let in, and fed heartily from my hand, after which it took its leave. I saw no more of it for two days, when it returned again for a short visit in very good case, and not appearing at all pressed for food. About a week after it returned to the same pane of glass, pecking as before; but I was occupied with a stranger, on business, and could not attend to it, and it departed for the season. On the 23d of July, in the following summer, I was standing at the same window, when a fine stout cock of this species lit upon the bar of the same pane close to my face, and began to peck as before for admission. Neither alarmed by my voice, nor my little boy's jumping up from his seat to look at it, it flew down upon some of the cage-pans which happened to be on the ledge of the window, and began pecking them as if to get food from them. It quickly departed again. But this is so contrary to the habits of the wild bird, that I consider it quite certain that the bird was my own nursling, which had returned, after its trip to Africa, to look at the window where it had been reared in its nest. The visit was a very pleasant little incident. How many things, which Europeans in vain desire to see, had my little wanderer witnessed since last he pecked at my window. Perhaps he had sung his plaintive notes near the grave of Clapperton, or peeped into the seraglio of the King of Timbuctoo, since we had parted.

We add some amusing remarks by Mr. Herbert, on the facility with which particular birds learn to imitate the human voice, or to execute a musical air:—

The bullfinch, whose natural notes are weak, harsh, and insignificant, has a greater facility than any other bird of learning human music. It is pretty evident that the Germans, who bring vast numbers of them to London which they have taught to pipe, must have instructed them more by whistling to them, than by an organ; and that their instructions have been accompanied by a motion of the head and body in accordance with the time; which habit the birds also acquire, and is no doubt of great use to them in regulating their song. In the same manner, that wonderful bird, Colonel O'Kelly's green parrot, which I had the satisfaction of seeing and hearing (about the year 1799, if I recollect rightly) beat the time always with its foot; turning round upon the perch while singing, and marking the time as it turned. This extraordinary creature sang perfectly about fifty different tunes of every kind—God save the King, solemn psalms, and humorous or low ballads, of which it articulated every word as distinctly as a man could do, without ever making a mistake. If a by-stander sang any part of the song, it would pause and take up the song where the person had left off, without repeating what he had said. When moulting and unwilling to sing, it would answer all solicitations by turning its back and repeatedly saying, "Poll's sick." I am persuaded that its instructor had taught it to beat time.

We conclude with some remarks by Professor Rennie, on the causes of the fall of leaves:—

It is not enough to account for the fall of the leaf to say it falls because it is weakened or dead; for the mere death of a leaf is not sufficient to cause its fall, as when branches are struck by lightning, killed by a bleak wind, or die by any similar cause, the dead leaves adhere tenaciously to the dead branch. To produce the natural fall of the leaf the branch must continue to live while its leaves die and are thrown off by the action of its sap vessels. The change of temperature from hot to cold seems to be one of the principal circumstances connected with the death and fall of the leaf. Hence it is that European trees, growing in the southern hemisphere, cast their leaves at the approach of winter there, which is about the same period of the year that they put them forth in their own climate. The native trees of the tropics are all evergreens, and like our hollies and pines have no general fall of the leaf, though there is always a partial fall going forward, and at the same time a renewal of the loss.

UNITED STATES OF AMERICA.

['Three Years in North America; by James Stuart, Esq.' 2 vols. 8vo. pp. 1094. Edinburgh, 1833.]

THIS is decidedly one of the most interesting works that have yet been written on that most interesting subject—the United States of America. As a picture, indeed, of the actual condition of the country, drawn from the life, and by an honest and able observer, we know of no other publication which we should compare with it. The great merit of Mr. Stuart's book appears to us to be this. Although he has told us throughout what he thinks upon matters of the highest general interest with perfect frankness, his work is mainly made up, not of arguments and speculations, but of facts—of what he actually saw and heard, rather than of any particular views or opinions with which he seeks to impress his readers. It is in the first place one of the most comprehensive descriptions of the great Transatlantic Republic which any traveller has yet given to us. Mr. Stuart was in America from August, 1828, till April, 1831,—a period, as his title-page intimates, of nearly three years; and during this protracted residence he not only made himself master of every thing that was to be seen and learned at New York, the heart of the Union, which was his principal home, and completed a tour by Albany and Utica to Lake Erie and

the Falls of Niagara, returning by Saratoga, Boston, and the sea-coast of Massachusetts and Connecticut; but he also visited the southern states, Virginia, North and South Carolina, Georgia, and Alabama, and after that the principal districts lying to the west of the Allegbany mountains, Louisiana, Illinois, and the other provinces of the new domain of civilization so rapidly extending over the mighty vale of the Mississippi. He traversed the Republic therefore in every direction; and made himself acquainted with each of its grand natural and political divisions in the north, in the south, and in the west. Secondly, this is the latest account of America which has appeared—an advantage of no small moment in the description of a country where change and progress are every where so busy, that, in many respects, it may almost be said to outgrow any likeness that is drawn of it faster than it can be sketched. Mr. Stuart has taken for his motto an aphorism of Dr. Johnson: "The true state of every nation is the state of common life;" and in the spirit of this remark he has made it his chief object to place before his readers the domestic and social condition and habits of the people among whom he travelled. Certainly so minute and complete a view of the Americans in these respects, and one at the same time so evidently the result of honest as well as acute and careful observation, and so perfectly undistorted by any thing like either malevolence or prejudice, has not till now been laid before the British public. Whatever difference of opinion may be entertained as to some of Mr. Stuart's speculative views or notions, it is impossible to read even a few pages of his book without feeling both a respect for his intelligence, and much esteem for the sincerity, the manliness, and the liberal, philanthropic, and tolerant temper, which evidently animate every sentence he writes.

There are some subjects of the very highest importance and interest, in regard to which ample details will be found in these volumes. We would direct attention in particular to the full and most valuable account of the State Prison at Auburn in vol. i., chap. 6; to the account of the state of agriculture in the territory of New York in chap. 12; to the notices of the American system of schools for popular education in chap. 14; to the interesting account in vol. ii., chap 13, of New Harmony, and the extraordinary experiment of which it was the scene; and to the details in the earlier chapters of the same volume respecting the slavery of the southern states. But these passages are all too long for our space, and we must therefore content ourselves by appending the following shorter extract as a specimen of the work:—

I had not been long at Mr. Anderson's, when I was applied to by a good-looking young man from the west of Fifeshire in Scotland, whose name was John Boswell, to give him, or procure for him, a letter of recommendation to a ship-builder in New York. I had never seen him before, so far as I knew; but I had been acquainted with his father, a very respectable person in his line, a farm overseer to the late Mr. Mutter of Annfield, near Dunfermline. Boswell's story was this:—He had been bred a ship-carpenter, had married, and was the father of two children. Finding his wages of about 2*s*. or 2*s*. 6*d*. per day insufficient for the maintenance of his family, he commenced being toll-keeper, but did not succeed in his new profession. He had, therefore, brought his wife and children to New York, being possessed only of a small sum of money, and of some furniture, a fowling-piece, &c. He had made application, immediately on his arrival at New York, some weeks previously for employment, but no one would receive him into his ship-building yard, in which there is much valuable property, without attestations of his character for honesty and sobriety. He accidentally heard of my being in the neighbourhood, and applied to me to give him such attestations. Knowing nothing previously of this young man but what I have mentioned, it was impossible for me to comply with his request, but I gave him a letter to a gentleman in the neighbourhood of New York, who might, I thought, be of use to him, stating exactly what I knew of him. Workmen in the ship-building line were at this period plentiful, and months followed before any opening occurred for employing Boswell. In the mean time his finances were exhausted, and he had been obliged to part with some of the property he had brought with him. He was beginning to wish himself well home again when an offer of work was made to him. I happened to be in New York on the very day when this occurred, and remember well the pleasure which beamed in his eyes when he told me of the offer, and asked me what wages he should propose. My advice to him was to leave that matter to his master, after he had been at work for a week, and showed what he could do. The next time I saw Boswell he was in the receipt of two dollars a day for ten hours' work, and of as much more at the same rate per hour, if he chose to be longer employed. His gains—for he told me that he could live at one-half of the expense which it cost him to live in Scotland, although his family here had animal food three times a day—soon enabled him to have a comfortable well-furnished house, where I again and again saw his family quite happy, and in which he had boarders. I sent for him to Hoboken, where I was then living, two or three days before I left New York in the month of April 1831, that I might learn if I could be the bearer of any communication to his friends in Scotland. He came over to me with a better suit of clothes on his back and a better umbrella than, I believe, I myself possessed. He only wished, he said, his friends to know how well settled he now was. He had earned on the preceding day almost as much as he could earn at the same business in Scotland in a week: and he hoped in less than twenty years to make a fortune, and return to Scotland.

I have mentioned the whole particulars of this case, because it contains information which may be useful to many. I had reason to know, before I left New York, that Boswell was an excellent workman,—industrious, honest, and sober. He told me that he never drunk much whiskey in his own country, and that he would take far less of it at New York, where, though it was much cheaper, it was of very inferior quality. Certificates of good character are very requisite for all emigrants to the United States, but especially for mechanics and labourers; and they should either be procured from magistrates or from clergymen, no matter to what sect they belong. I need not add, that it is most important to obtain recommendations, where they can be got, to some respectable individual at the port where the emigrants first of all arrive.

COMPANION TO THE ALMANAC, FOR 1833.

The little volume before us is the sixth of the series published by the Society under the above title. The publication is an almost indispensable appendix to every almanac; and, indeed, were the stamp on almanacs either entirely abolished, or reduced to a penny or two-pence, the Companion would probably form an integral portion of the Almanac itself. In the United States, where there is no stamp at all upon almanacs, there is an excellent publication, formed upon the model of this 'Companion,' which is preceded by the Calendar. In Great Britain the Calendar demands a stamp duty of fifteen-pence.

The 'Companion,' for 1833, contains a great deal of statistical matter of unusual interest and importance; nor is it without its due share of scientific information. The first article on Comets is profound, and at the same time popular; that on the Heights of Mountains in Europe is the fullest account that has appeared in England, containing the measurements of 971 mountains, interspersed with remarks on the various groups. The most important statistical article is a very full abridgement of the Population Returns of all places containing not less than 3,000 inhabitants. The operations of the Reform Bill and the Boundaries' Act are exhibited in connection with this view of the population. A paper on the East-India Company, and another on the Bank of England, both founded upon parliamentary reports, contain a great deal of valuable information.

The Abstracts of Acts of Parliament occupy nearly a fifth of the volume. To many persons such matter may appear dry and technical. But it ought to be considered that such a publication as this offers, to the great body

of the people, the only means of acquiring a knowledge of the new laws which they are called upon to obey. The Reform Bill, that most important feature of the legislation of the last Parliament, is here given at considerable length, with all the schedules that are necessary to be known by electors either for the registry of their own claims, or for disputing the claims of others*. The abstract of Parliamentary Returns embrace a multitude of facts relating to finance and commerce.

From the article entitled 'Brief Notices of the Progress of Public Improvements,' we extract an account of a new suspension bridge at Leeds:—

A suspension bridge of a somewhat novel construction has lately been erected at Hunslet near Leeds, which from its form, and in contradistinction to the *chain* suspension bridges, may not inaptly be called the *bow and string* suspension bridge. It was executed from the designs and under the direction of Mr. George Leather, of Leeds, civil engineer. Instead of the chains—the usual means of suspension—two strong cast-iron arcs span over the whole space between the two abutments. These arcs spring from below the proposed level of the roadway, but rise, in their course, considerably above it, and from them the transverse beams which support the platform of the bridge are suspended by malleable iron rods.

In the present instance, the suspending arch is 152 feet wide, spanning over the river Aire, and the towing or hauling path; and there is besides a small land arch of stone on each side.

The footpaths are on the outside of the two suspending arcs, and the carriage-way passes between them.

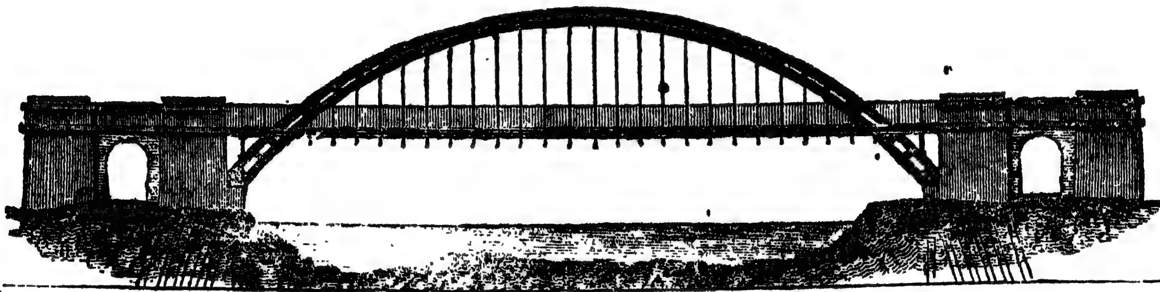
Each of the suspending arcs is cast in six parts, and rowelled together; and the ends fit into cups cast upon the springing or foundation plates, forming a ball and socket joint. The cast-iron transverse beams which support the roadway are suspended at about every five feet. The roadway is of timber with iron guard plates on each side; and upon the top of the planking are also laid malleable iron bars ranging longitudinally for the wheel-tracks, and transversely for the horse-tracks.

The foundations of the bridge rest upon bearing piles, and the total expense was about £4,200. We believe that this bridge is only the second of its kind, the Monk Bridge at Leeds†, which was also executed from designs and under the direction of Mr. Leather, being the first.

The following are the principal dimensions:—

	FEET.
Space between the abutments, or span of the suspending arcs	152
Abutments with land arch, each 44 feet	88
Total length of the bridge	240
Width of the roadway	24
Width of each footpath, 7 feet	14
Total width of the bridge	38
Height from the surface of the river to the springing of the suspending arcs	7
Height from do. to the upper surface, or extrados of the suspending arcs	43
Height from do. to surface of road	20½
Height of upper surface of suspending arcs above the surface of the road	22½

[Suspension Bridge over the River Aire, near Leeds.]



[Scale 1 inch to 40 feet.]

The 'Companion' is concluded with a double List of the new House of Commons; the first, arranged in the alphabetical order of places; the second, in that of Members' names. The publication of the work has been delayed a month for the completion of this document.

* We take this opportunity of directing the public attention to a very valuable work, recently published, entitled 'Notes of Proceedings in Courts of Revision, held in October and November, 1832, before James Manning, Esq., Revising Barrister, with Explanatory Remarks on the Reform Act. By William M. Manning, Esq.' This, although it is, strictly speaking, a book for lawyers, contains much information of the highest importance to all electors, and more especially to overseers and other persons concerned in the business of elections. The Revising Barrister's decisions appear to have been given with the utmost care and deliberation. As his labours were confined to the county of the Isle of Wight and the borough of Newport, the limited extent of the voters afforded an opportunity of giving to the new questions of election law which arose, a fuller consideration than the period prescribed for the revision would allow of in more extensive districts. The notes on the Reform Act, which are appended to the decisions, contain a great body of constitutional learning, and of practical directions for the legal construction of any doubtful clause in an enactment embracing so many novel as well as complicated particulars.

† The *Monk Bridge, Leeds*, was erected in the year 1827. Besides the suspension arch, which spans over the river Aire, there are two small land arches, and a 24-feet elliptical arch over the Leeds and Liverpool canal, which at this point is only about 50 feet from the river.

	FEET.
The total length of this bridge is	260
Span of the suspension arch	112
Width of the bridge	36
Height from the surface of the river to the springing of the suspending arcs	7
Height from do. to the top or extrados of the suspending arcs	34
Height from do. to the surface of the road	20
Height of upper surface of suspending arcs above the surface of the road	14

The total cost, including the canal bridge, &c., was about £4,800.

NOTICES.

It was announced in the last Supplement that in future a *double* Supplement would be issued in those eight months of the year which only contained four Saturdays, so that each Monthly Part should comprise six sheets. In consequence, however, of many representations, both from individual purchasers and the dealers in cheap works, that this additional charge to the buyers of the numbers would often prevent their regular purchase of the work as it comes out weekly, the Committee have thought it right not to act upon this announcement; being reluctant to press heavily on the restricted means of many thousand purchasers of the Penny Magazine, who have few other opportunities of acquiring knowledge. The Publisher has undertaken that in future the Wrapper of the Parts shall be printed on a stronger paper, and that the sheets shall be stitched together in a neater and more durable manner.

PENNY CYCLOPÆDIA.

There will be two Supplements published in February, to complete six Numbers in that month, viz., on the 13th and 27th.—Part I. is now ready.

⁎ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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THE PENNY MAGAZINE

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NIOBE.



[Statue of Niobe.]

Niobe, the daughter of Tantalus, according to the ancient story, was blessed with seven sons and as many daughters. In the pride of her heart she dared to triumph over the goddess Leto or Latona, who had only two children, Apollo, and Artemis, called by the Romans Diana. To punish Niobe for her insolence, Apollo and Diana destroyed all her children with their arrows; and, according to some stories, the wretched mother was turned into stone through grief, and even the solid rock still continued to shed tears. Pausanias, a Greek writer of the second century of our era, who was fond of old marvellous tales, tells us that on Sipylus, a mountain of Asia Minor, he saw this Niobe of stone. "When you are near it," says he, "it is nothing but a steep rock, bearing no resemblance at all to a woman, much less to one weeping. But when you are at some distance, you might imagine it to be the figure of a female weeping and in great distress."

The story of Niobe became a favourite subject for sculptors; and it is not improbable that there were once

several groups representing the mother and her children. Pliny speaks of one being in a temple of Apollo at Rome in his time:—"It is doubtful whether Scopas or Praxiteles made the dying Niobe and her children."

There is now extant a very large number of short Greek pieces in verse, commonly called epigrams, though they do not properly mean epigrams in our sense of the word. They are rather short pieces, such as would be appropriate for *inscriptions* on temples, statues, &c., or merely such lines as we often see written in albums, or to commemorate briefly some particular event, or to express concisely some sentiment; and they do not necessarily terminate with any pointed saying or witticism. Several of these epigrams refer to some figure or figures representing Niobe, or Niobe and her children. One of them, in two lines, runs thus:—

"The Gods turned me while living into stone, but out of stone Praxiteles has restored me to life."

This was evidently intended to express the writer's admiration of some piece of sculpture to which the chisel of Praxiteles had given a living and breathing form.

But there is another longer inscription which alludes more particularly to some group of which the Niobe, now at Rome, seems to have been a part; or at least there can be little doubt that the following lines refer to a *similar* group:—

"Daughter of Tantalus, Niobe, hear my words which are the messengers of woe; listen to the piteous tale of thy sorrows. Loose the bindings of thy hair, mother of a race of youths who have fallen beneath the deadly arrows of Phœbus. Thy sons no longer live. But what is this? I see something more. The blood of thy daughters too is streaming around. One lies at her mother's knees; another in her lap; a third on the earth; and one clings to the breast: one gazes stupified at the coming blow, and one crouches down to avoid the arrow, while another still lives. But the mother, whose tongue once knew no restraint, stands like a statue, hardened into stone."

Among the various figures still extant, which are supposed to belong to the group of the Niobe, it is not easy to say which are genuine parts of the whole, and which are not. It seems probable that the mother with one of her daughters formed the centre, and that other figures were arranged on each side. It has further been conjectured that the whole occupied the tympanum or pediment of a temple, as the great figures of the Theseus, Ilissus, &c., in the Elgin collection, decorated the pediment of Minerva's temple at Athens. One critic has gone so far as to deny the possibility of the group of Niobe and her daughters having been placed in the pediment of a temple, *because* there would be no room for the angry deities whose arrows are piercing the children of Niobe; as if the whole impression produced was not infinitely greater, *because* the angry deities are unseen. The fact is, that to any one who knew the story of Niobe, the mere sight of the complete group would tell the tale at once:—"That they are the sons and daughters of Niobe, who, in the bosom of their mother, or near her, sink beneath the arrows of the deities, or try to escape from them, we see by a single glance at this group of figures, who are in various attitudes—fallen, falling, flying, or trying to hide themselves, full of anguish and despair; while the colossal figure of the mother stands in the midst, expressive of the deepest agony *."

* Thiersch, p. 316.

WANDERING ITALIANS.

The attention of most of our readers must have been excited by the poor Italian boys that frequent our streets, selling images, playing organs, or exhibiting monkeys, land tortoises, and white mice. This numerous class is found, and generally in greater numbers than with us, in France, in Germany, even in Russia, and in other continental countries. They are not less remarkable on account of their dark expressive countenances, and picturesque appearance, than from their quiet, inoffensive conduct. It is very rare to find in any one of the many countries to which these wanderers repair, a single proof of a crime or serious offence of any kind committed by them. This is a circumstance the more to be wondered at, as they for the most part leave their homes in very tender years, and are frequently exposed to the privations and temptations of extreme poverty. Those among them who are venders of images, by selling for a few pence the plaster busts of great men and casts from ancient works of art, may pretend to the dignity of traders, and even have the merit of improving and propagating a taste for the fine arts; while those who exhibit the different animals may awaken an interest for natural history, by showing the docility of those creatures who have learnt obedience to man. As a body, if they are to be held as vagrants, they must be considered as the most inoffensive and amusing of vagrants.

The venders of images come almost without an exception from the territory of Lucca, in Tuscany, not many miles from Florence. The way in which their companies are formed is this:—One, or sometimes two men, who possess the art of casting figures in moulds, propose a campaign; and having collected a number of poor boys, of whom they become the captains, leave their native valley and cross the Apennines and the Alps, marching in a little corps of ten, twelve, or fifteen. The writer of this account once walked over the Alps by the road of Mount Cenis, with a company of this sort, from whose chief he learned many particulars as to the modes of their proceeding. Their moulds or forms, with a few tools, had been despatched before them by the waggon to Chambery, the capital city of Savoy, where they proposed to make their first sojourn. They find the plaster and other simple materials requisite for the formation of their figures, in nearly every large town to which they go; and they never fix their quarters for any length of time, except in large towns. On arriving, therefore, at Chambery, the artist, or the principal of this company, having received his moulds, would set to work, despatching the boys who were with him through the city and the little towns and villages in the neighbourhood, to sell the figures which he could rapidly make. When the distance permitted, these boys would return at night with the fruits of the day's sale to their master, who lodged and fed them; but it would often happen, when they took a wider range among the mountains and valleys of Savoy, that they would be absent for several days, under which circumstances they would themselves purchase their cheap food and shelter out of the money they might obtain for the goods they disposed of. When the market became languid in and about Chambery; the master would pack off his moulds and tools for Geneva, and follow them on foot with his little troop, each of whom would carry some few figures to sell at the towns and villages on the road to that city. At Geneva, he would do as he had done at Chambery; and when that neighbourhood was supposed to be supplied, he would transfer himself and his assistants in the same way to some other place. About nine months after passing the Alps with him, the narrator found his old fellow traveller, the image-maker, at Fontainebleau, in the forest of that name. He was busily at work, with only two boys in the town with him; the rest being scattered about the country. By this time he had crossed the Jura mountains, traversed the greater part of France, and was on the point of going to Paris, whence he intended to work his way, by Amiens and Calais, to England, where he promised himself a golden harvest. His brother, who had been absent from home several years, was with a corps similarly constituted, exploring the less populous

provinces of Russia.* This man himself had already been into Germany as far as Leipsic. He was intelligent, industrious in his way, exceedingly sober, and well behaved*, and spoke very good Italian, as indeed did all his boys, being Tuscans born. The image venders, indeed, are, as we had said, nearly without an exception, natives of Tuscany, where even the poorest of the people speak a graceful and pure language. The rest of the wandering Italians use different *patois*, or dialects, according to the places from which they come, and are scarcely to be understood by the Italian scholar who has not lived among them.

After the Lucchesi, or natives of Lucca, these itinerants may be classed generally under two heads—mountaineers from the Apennines, and mountaineers from the Italian ridges and valleys of the Alps. Lower Italy, or the kingdom of Naples, the states of Rome, and those of the Grand Duke of Tuscany, rarely send forth any of these emigrants; but we find these troops formed in great numbers, going on towards Lombardy, in the states of Parma. A great part of this territory, which is now allotted to Maria Louisa, the widow of Napoleon Bonaparte, is occupied by the rude Apennines, where the poverty of the soil and the severity of the climate are such as are hardly expected to exist in Italy. On the northern side of these mountains the corn, scantily sown, is not ripe till September; and frequently, even when it has escaped the effect of the heavy rains and torrents, which occasionally wash away the soil and the ridges and walls which they are obliged to build on the declivities to retain it, the grain never comes to healthful maturity. In some seasons the rush of waters down the precipitous sides of these mountains is so tremendous that the terraces are destroyed and the soil washed away to the bare rock. At other times hurricanes whirl the earth and its produce into the air. In both cases, years of labour and ingenuity, to render their mountainous territory susceptible of cultivation, are destroyed, and families and whole districts are reduced to extreme misery. The other scanty resources of these poor peasants of the Apennines are a produce of chesnuts, and the cutting of wood, which as they have no roads to transport it by, is employed almost wholly for purposes of fuel and charcoal. Some favoured individuals possess a few flocks of sheep in the lower, and of goats in the upper, parts of the mountains.

To procure, therefore, that subsistence which their own country does not afford, these people emigrate in various directions, and in the exercise of various callings. The emigrations of most of them are very temporary; and it may be mentioned here, that, rude as is their home, even those who emigrate for longer periods of time invariably propose to return to it, as soon as they shall have made some money. A curious fact is, that each district has, and has had for many generations, its peculiar professions and line of emigration, never interfering with those of another district. From the wild tract of country (a length of nearly thirty English miles), which from the town of Berceto extends along the ridge of the Apennines to the western side of the Duchy of Modena, the male population go to the island of Corsica, where they employ themselves as agricultural labourers and wood-cutters. On account of the distance some of these stay away two or three years at a time. In the tract immediately beneath this, the men repair every year to labour in the corn-fields in the unhealthy and almost pestilential *maremme*, or marshes of Tuscany, whence many of them are sure to return with *mal-aria* fevers. The sobriety, the abstemiousness of these men—the privations to which they submit to save a little money—the *wonderfully little* on which they live, fill an Englishman with astonishment. Their sole object is to return home with their savings; to add to the sum of which, both those from Corsica and those from Tuscany, occasionally addict themselves to a little sly or contraband trade. The articles they import are chiefly *salt* and *gunpowder*—articles which the petty governments of Italy have, in their wisdom, thought fit to monopolize. The articles which they export into Tuscany are chiefly rags for the manufacture of paper, which export, by the same wisdom, the government of Parma prohibits, or loads with tremendous duties, in order to encourage the paper manufactories of its own states. In these smuggling operations, whose full success can only give them each a few shillings of profit, the poor peasants undergo the greatest hardships and dangers; for to avoid the lines of frontiers and custom-houses, and all those who might interfere with their trade, they gain their homes by traversing the wild and deep ravines, and the loftiest and least frequented crests of the Apennines, where they are occasionally buried in the snow or carried away by the whirlwind, and still more frequently detained whole days in some savage, isolated spot, by the inclemencies of the climate.

The districts of Borgo Val di Taro, the villages of Bardi, Compiano, Bedonia, &c. still in the Duchy of Parma, and on the Apennines between Parma and Genoa, have considerably more resources and more productive lands than those we have described. Here indeed we find well cultivated farms, rich pastures, and an appearance of comparative prosperity; but still the means are insufficient to the support of the population; they consequently emigrate in great numbers. These districts, indeed, furnish many of those wandering Italian boys that we see about our streets, to whom we particularly alluded at the opening of this little account.

Some of those who wander from home with animals engage themselves in England and other countries, in the service of the proprietors of menageries. One of the sufferers, from the fury of the celebrated elephant in Exeter 'Change a few years ago, was a native of Compiano, who had his ribs broken by the trunk of the maddened quadruped. But by far the greatest number in this profession perambulate on their own account, with monkeys, dogs, bears, camels, and hyænas. Those of them who come to England generally confine themselves to monkeys, probably on account of the difficulty and expense of the voyage. The extreme poverty in which these people are when they prepare for a first emigration, puts it out of their power to provide these animals themselves. There are, therefore, certain men who have made money in the calling, and no longer wander themselves, whom they call proveditori or providers, and these sell, or let out to them on certain conditions, the creatures which the emigrants are in need of. And here also frequently occurs a curious co-operation of capital and labour; four of these poor fellows will buy one bear among them, and hold the property on the tenure of what they call "a paw a-piece" (una zampa per uno). Two of them leading it from one country to another, and showing it together, divide the profits equally, and then save or remit given proportions of the profits to the two proprietors at home. One of their proveditori, a certain Rossi of Compiano, is now a man of much substance, with considerable landed property in the Apennines. He is the greatest speculator in his line, frequently importing his animals direct from Africa. On the Continent, a few years since, if you asked any of these itinerants whence they came, and who had provided them, you were pretty sure to be told that they were Rossi of Compiano's men. In their native moun-

* During the jealousies and deadly hatred that distracted Italy in the middle ages, and prepared the servitude and misery of that beautiful country, the Lucchesi obtained a very bad name; and it is curious to observe how long the recollection of this has lasted among the people, for to this day, a man of Lucca, if asked where he comes from, always replies, "Vi sono de' buoni, e de' cattivi dappertutto—sono Lucchese per servirla," or, "There are good and bad people every where. I am a Luccheso at your service!"

tains, if you inquire of their families or their wives, whom they always leave at home, where an absent relative or husband is, the almost infallible answer is, in their dialect, "E peò mondo cò à commedia," in good Italian, "E pel mondo con la commedia," or in English, "He is wandering about the world with *the comedy*." These simple people give the elevated name of *comedy* to the gambols of monkeys and the dancing of bears. Besides dancing bears, these itinerants from Compiano, Bedonia, and Bardi had dancing cocks, which we do not remember ever to have seen with them in England, and of late years, only rarely with them on the Continent. The way in which they taught this courageous bird to dance was this: They took a flag-stone surrounded by high rims of stone or clay, or a large round earthen pan with a flat bottom, and placed it over a small slow fire; then, having cut or secured the cock's wings, and protected his feet and spurs by a piece of cloth on either leg, they put him down on the confined arena from which he could not escape, and while one man played a lively tune on some instrument, another blew the fire under the pan or stone. As soon as the cock felt the heat under his feet he naturally began to lift them up; and this he did quicker and quicker as the heat increased, until the rapidity of their motion represented a dance. It was not necessary often to repeat this cruel lesson, for after two or three rehearsals of this sort, the cock, wherever he might be placed, would begin to lift up his legs or dance as soon as the music, which had formerly been an accompaniment to his sufferings, began to play. The more troublesome or more dangerous bear received his rudiments in much the same manner. His fore-legs were left in their natural state, and his hind ones were protected by a sort of leather boot or sandal. He was then put upon a heated flag-stone, when he naturally raised his fore-paws in the air, and then moved his hind-legs up and down to avoid the heat.

The most interesting trait in the character of these inoffensive wanderers is their never-failing attachment to their mountain homes. Go where they will, let them be as fortunate as they may, they rarely or never think of a permanent settlement, but look back to Italy and the Apennines as the place of their rest. The object of all their toils and travels, their great and their sole ambition, is to become the owners of a house and a little bit of land, if not on the precise spot, at least in the immediate neighbourhood of the villages in the mountains where they were born. In the natural course of things, many never attain the desired goal; some of the wanderers fall far from home, victims to the severity of the climate as in Russia, or to its unhealthiness in other places; some are unfortunate in their animals, or in the tracts of country they may have chosen to explore; some, though very few, are improvident, and die abroad in wretchedness, or return home as indigent as they first set forth. But still, there are continually instances, after years of wandering, of these men returning to their native villages in the possession of a comfortable independence. It may be conceived, that from the poverty of the country and their humble notions and way of living, a small sum of money will suffice for this independence. The first thing they do under these fortunate circumstances is to purchase a piece of ground where they erect a little house: and the few foreign travellers who have visited this particular mountainous district, must have observed and admired that their houses are built in a better style than the rugged cottages of their neighbours, and that notions of snugness, domestic comfort, and cleanliness have been imitated from England, Germany, and other distant countries in which the poor itinerants have lived. The returned wanderers become the oracles of their neighbourhood. They can talk of foreign countries, and cities, and habits of life, and relate all the adventures they encountered on their travels. The fame and the magnificence of London, and much that is glorious and good in us as a nation, as far as it could impress the limited, uncultivated faculties of such persons, have been thus sounded from one end to the other of the mountains in the Duchy of Parma.



[Portrait of an Italian exhibiting in London.]

Utility.—That useful knowledge should receive our first and chief care, we mean not to dispute. But in our views of utility, we may differ from some who take this position. There are those who confine this term to the necessaries and comforts of life, and to the means of producing them. And is it true, that we need no knowledge, but that which clothes and feeds us? Is it true, that all studies may be dispensed with, but such as teach us to act on matter, and to turn it to our use? Happily, human nature is too stubborn to yield to this narrow utility. It is interesting to observe how the very mechanical arts, which are especially designed to minister to the necessities and comforts of life, are perpetually passing these limits; how they disdain to stop at mere convenience. A large and increasing proportion of mechanical labour is given to the gratification of an elegant taste. How simple would be the art of building, if it limited itself to the construction of a comfortable shelter. How many ships should we dismantle, and how many busy trades put to rest, were dress and furniture reduced to the standard of convenience. This "utility" would work great changes in town and country, would level to the dust the wonders of architecture, would annihilate the fine arts, and blot out innumerable beauties, which the hand of taste has spread over the face of the earth. Happily, human nature is too strong for the utilitarian. It cannot satisfy itself with the convenient. No passion unfolds itself sooner than the love of the ornamental. The savage decorates his person, and the child is more struck with the beauty, than the uses of its raiment. So far from limiting ourselves to convenient food and raiment, we enjoy but little a repast which is not arranged with some degree of order and taste; and a man who should consult comfort alone in his wardrobe, would find himself an unwelcome guest in circles which he would very reluctantly forego. We are aware that the propensity to which we have referred, often breaks out in extravagance and ruinous luxury. We know that the love of ornament is often vitiated by vanity, and that, when so perverted, it impairs, sometimes destroys, the soundness and simplicity of the mind, and the relish for true glory. Still, it teaches, even in its excesses, that the idea of beauty is an indestructible principle of our nature, and this single truth is enough to put us on our guard against vulgar notions of utility.—*W. E. Channing, D.D.* '*On the Importance and Means of a National Literature.*'

Legal Age.—The law of England not making portions of a day, except in cases in which it becomes necessary to ascertain the priority of distinct events occurring on the same day, as the execution of several deeds, &c., a person is of full age who has lived during some part of every day necessary to constitute a period of twenty-one years. Thus a person born at eleven o'clock at night on the 1st of January, will be of age immediately after the midnight between the 30th and 31st of December, although he will then want forty-seven hours of completing twenty-one years.—*Manning's Proceedings in Courts of Revision.*

THE DOGS OF ST. BERNARD.

[From the Menageries, vol. I.]



[Child preserved by a Dog.]

The convent of the Great St. Bernard is situated near the top of the mountain known by that name, near one of the most dangerous passages of the Alps, between Switzerland and Savoy. In these regions the traveller is often overtaken by the most severe weather, even after days of cloudless beauty, when the glaciers glitter in the sunshine, and the pink flowers of the rhododendron appear as if they were never to be sullied by the tempest. But a storm suddenly comes on; the roads are rendered impassable by drifts of snow; the avalanches, which are huge loosened masses of snow or ice, are swept into the valleys, carrying trees and crags of rock before them. The hospitable monks, though their revenue is scanty, open their doors to every stranger that presents himself. To be cold, to be weary, to be benighted, constitute the title to their comfortable shelter, their cheering meal, and their agreeable converse. But their attention to the distressed does not end here. They devote themselves to the dangerous task of searching for those unhappy persons who may have been overtaken by the sudden storm, and would perish but for their charitable succour. Most remarkably are they assisted in these truly Christian offices. They have a breed of noble dogs in their establishment, whose extraordinary sagacity often enables them to rescue the traveller from destruction. Benumbed with cold, weary in the search for a lost track, his senses yielding to the stupifying influence of frost, which betrays the exhausted sufferer into a deep sleep, the unhappy man sinks upon the ground, and the snow-drift covers him from human sight. It is then that the keen scent and the exquisite docility of these admirable dogs are called into action. Though the perishing man lie ten or even twenty feet beneath the snow, the delicacy of smell with which they can trace him offers a chance of escape. They scratch away the snow with their feet; they set up a continued hoarse and solemn bark, which brings the monks and labourers of the convent to their assistance. To provide for the chance that the dogs, without human help, may succeed in discovering the unfortunate traveller, one of them has a flask of spirits round his neck, to which the fainting man may apply for support; and another has a cloak to cover him. These wonderful exertions are often successful; and even where they fail of restoring him who has perished, the dogs discover the body, so that it may be secured for the recognition of friends; and such is the effect of the temperature, that the dead features generally preserve their firmness for the space of two years. One of these noble creatures was decorated with a medal, in commemoration of his having saved the lives of twenty-two persons, who, but for his sagacity, must have perished. Many travellers who have crossed the passage of St. Bernard, since the peace, have seen this dog, and have heard, around the blazing fire of the monks, the story of his extraordinary career. He died about the year 1816, in an attempt to convey a poor traveller to his anxious family. The Piedmontese courier arrived at St. Bernard in a very stormy season, labouring to make his way to the little village of St. Pierre, in the valley beneath the mountain, where his wife and children dwelt. It was in vain that the monks attempted to check his resolution to reach his family. They at last gave him two guides, each of whom was accompanied by a dog, of which one was the remarkable creature whose services had been so valuable to mankind. Descending from the convent, they were in an instant overwhelmed by two avalanches; and the same common destruction awaited the family of the poor courier, who were toiling up the mountain in the hope to obtain some news of their expected friend. They all perished.

A story is told of one of these dogs, who, having found a child unhurt whose mother had been destroyed by an avalanche, induced the poor boy to mount upon his back, and thus carried him to the gate of the convent. The subject is represented in a French print, which we have copied.

ON THE PRONUNCIATION OF HARD WORDS.

It is often a subject of embarrassment to many well-informed persons, that they feel themselves unable to pronounce certain hard words, according to what is esteemed the correct way. Hence it may happen that in reading or conversation they may sometimes expose themselves to the ridicule of persons much more ignorant than themselves, who, however, possess the advantage of being thought able to pronounce hard words in the orthodox fashion. Ridicule and sneers are indeed powerful weapons, even in the hands of a fool; and the wisest men are sometimes glad to escape from an adversary, who is only invincible because he has not sense enough to know when he is beaten. Though we must allow that it is very useful to have a certain fixed way of pronouncing words, just as it is useful to have certain fixed names for things, we shall endeavour to show, for the benefit of those who feel apprehensive about mispronouncing a word, that there are very few, if any, who can *altogether* avoid such errors; that the standard of right pronunciation is sometimes very difficult to fix, and also very difficult to express to the eye; and that, in a very great number of cases, it is of no importance at all in which way a word is pronounced. We shall also give a few rules, that may be of use to some of our readers.

The class of words that causes most difficulty to readers, consists (1) of Greek and Roman names of persons and places, or (2) of terms in natural history, architecture, mineralogy, &c., which are compounded of Greek and Latin words. As for real Latin, or French, or German words which may be occasionally introduced into a work, either when we give the title of a book, or in any other case where it is necessary, the truth is, that not one man in fifty will pronounce them *all* right, and no man *can* pronounce them right unless he is acquainted with the languages to which each foreign word belongs. If a person then mispronounces a word of this class, it only shows that he has not had the opportunity of learning the foreign language; which can hardly be made a subject of reproach, especially to those whose means are limited. We shall now speak more particularly of the *first* class of words, comprehending real Greek and Roman names, which must necessarily often occur in the Penny Cyclopædia.

There are two things to be observed in pronouncing a word. One is the *sound* which we give to each letter, or rather to each syllable; and the second is the stress or emphasis by which some particular syllable is distinguished from the rest. Thus, in the words *Abdéra*, *abdómen*, which occur in No. 2, the reader cannot fail to pronounce them right, if he only lays the emphasis

on the second syllable. The word *abdamen*, used to designate a particular part of the body, is almost become a part of our language; yet it is a real Latin word, and according to the principles of that language should be pronounced, as we have marked it, *abdómen*. Some, however, must have heard many very excellent medical men pronounce the word, *ábdomen*. We merely mention this to show that persons who have spent much money on their education, cannot always avoid even the most trifling error. Occasionally we hear from the pulpit *Thessalónica* instead of *Thessalonica*, the name of a town in Macedonia, which occurs in the Acts of the Apostles. Owing to a mistake, the accent was omitted in *Abdéra* and *abdómen* in the first impressions of No. 2 of the Cyclopædia; but this is now corrected, and we shall always, whenever a real Greek or Latin name occurs at the head of an article, mark with an accent thus ('), the syllable, which is to be distinguished from the rest in the pronunciation. Such words as *Archimédes*, *Apollodórus*, *Apollónius*, *Aristómenes*, may serve as examples. It should be remarked, that in such a word as *Archimédes*, the accent which is placed on the third syllable shows that it is to be pronounced distinct from the following—*Ar-chi-méd-es*, not *Ar-chi-médes*; in like manner *Arist-óm-en-es*, not *Arist-óm-enes*.

A great number of Greek proper names end in *us*, preceded by a vowel: *Méne-lá-us*, *Agési-lá-us*, *Erichthó-ni-us*, *Dari-us*, &c.; and in all these cases the vowel which precedes *us*, forms a separate syllable. The accent shows whether we must lay the chief stress on the vowel preceding *us*, or on some syllable further from the end of the word. It will be observed that in three of the instances which we have just given, each word, owing to its length, has a double accent, which is the case in such English words as *contémporáneous*, *insurmoúntable*. Many Greek names of towns end in *ia* (two syllables), as *Samaría*, *Philadelphía*. The reader will see that we have marked these words to be pronounced with the emphasis on the last syllable but one—*Philadelphía*, not *Philadél-phia*, &c., and this is quite correct. Yet the practice in our churches is to pronounce these words with the accent on the last syllable but two; and it would not, perhaps, be thought a proof of very good sense, if the clergy were to introduce that mode of pronunciation, which most of them know to be correct. Usage has so entirely got the better of the correct practice, that it would be considered only foolish pedantry to say, *Philadelphía*.

Many persons pride themselves on a little knowledge of Latin and Greek, and are very apt to assume a superiority over those who know nothing of these ancient languages. But it is a fact that ought to be distinctly asserted, because it is undeniable, that not one tithe of those who study these languages ever really learn them well; nor are they competent judges of what is right or wrong in the pronunciation of Greek and Roman names. Even in our great schools, where so much attention is paid to what they call prosody, or "the art of pronouncing Greek and Latin words correctly," many modes of pronunciation are established by usage, which no sound critic can approve.

The other difficulty that remains as to Greek and Roman words is,—how are the vowels and consonants to be pronounced? In England, we pronounce the vowels just as we do in our own language; and, in such words as *Demósthenes*, *Cicero*, *Æschines*, no mistake can possibly be made. But though this practice may be called *right* as far as the usage of this country is concerned, it is not certain that in all instances it is the real *ancient* pronunciation, and indeed, in some cases, it is certain that it is not. The Germans pronounce the *au* in such words as *Paulus*, just as we pronounce *ou* in *house*, and in doing this they follow the practice of their own language. Œ and Æ in Latin words are pronounced [illegible] just like *e* in *fever*: examples, *Cœlius*, *Cæsar*: sometimes *æ* at the beginning of a word is pronounced like a short *e*. The consonants present but few difficulties, if the reader only wishes to know what is the established mode of pronunciation in this country, and does not inquire what was probably the ancient mode. *C* is pronounced like *s* before *e*, *i*, *æ*, *œ*, as in *Cicero*, *Cæsaréa*, *Cœlius*; and in all other cases like *k*. *G* is generally pronounced like *j* before *e*, *i*, *æ*, *œ*, as *Gémini*, &c.: in other cases it is pronounced like *g* in *gander*. *Ch* is always pronounced like our *k*, as in *Achæa*, *Archons*, *Archimédes*, *Æschines*. *H* at the beginning of all Greek names or words, such as *Homer*, *Hesiod*, *heretic*, &c. should always be strongly pronounced, and not half suppressed as is the common practice in the metropolis and some other parts of England, even among many of the educated.

[To be continued.]

EXECUTION OF MARY STUART.

THE 8th of February, 1587, is memorable as the day of the execution of Mary Queen of Scots, in the great hall of Fotheringay Castle, in Northamptonshire. The outlines of the history of this unfortunate princess are so generally familiar, that we shall here only recapitulate a few dates, in order to place its course the more clearly before the mind of the reader. She was the daughter of King James V. of Scotland, by his second wife, Mary of Lorraine, sister of the Duke of Guise, and widow of Louis of Orleans, Duke of Longueville; and she was born at the Palace of Linlithgow, on the 7th of December, 1542. On the 14th, by the death of her father, she became Queen of Scotland in her own right. On the 21st of August following she was crowned at Stirling. Even before this an active contest had commenced between Henry VIII. of England and his partizans on the one hand, to procure the young sovereign in marriage for his son Edward; and the Queen Mother, Cardinal Beaton, and their faction on the other, to preserve her for a French, or other continental alliance. To protect her from Henry's attempts to obtain possession of her person, she was soon after removed by her mother, from Stirling to a monastery, situated on an island in the Loch of Menteith. In this asylum she remained till the year 1548, when it was resolved to send her to France; the fatal result of the battle of Musselburgh (or Pinkie), fought on the 10th of September preceding between the Regent Arran and the Protector Somerset, having excited a stronger fear than ever of her falling into the hands of the English, should she remain in the country. Accordingly, having been brought for that purpose to Dunbarton Castle, she embarked on the Clyde, and arrived safely at Brest on the 13th of August. At the court of France she received a careful education, not only in all the accomplishments, but in all the learning of that age, and the fine capacity with which she was gifted by nature enabled her to make the happiest return to the efforts of her instructors. On the 24th of April, 1558, she was united in marriage to the Dauphin, afterwards Francis II., the prince being a few months younger than herself. The death of her father-in-law, Henry II., on the 10th of July, 1559, raised her to the throne of France; but she only enjoyed her elevation for about a year and a half, her husband dying on the 5th December, 1560. Having also lost her mother, who had hitherto acted as regent in Scotland, on the 10th of June preceding, and the affairs of that country having fallen into great confusion, Mary now determined to return to her hereditary dominions; and with that view she embarked at Calais on the 5th of August, 1561, and, after a voyage of five days, landed in safety at Leith, having escaped the English fleet in a fog. On the 29th of July, 1565, she married her relation Henry Stuart, Lord Darnley, the son of the Earl of

Lennox, and, through the countess, his mother, the grandson of Margaret, daughter of Henry VII. of England, from whom Mary herself was also descended in the same degree. It was in virtue of this descent that she claimed during the life of Elizabeth to be considered the heir presumptive to the English crown. That crown actually devolved eventually upon her son James VI. The assassination, in her presence, of her Italian secretary David Rizzio (or more properly Riccio), by Lord Ruthven and other conspirators, instigated by her husband, took place at Holyrood House on the 9th of March, 1566. On the 19th of June following she gave birth to a son, afterwards James VI. On the 10th of February, 1567, Darnley was killed by the blowing up of the house called Kirk of Field, in the vicinity of Edinburgh, where he lay ill,—an event which was unquestionably the result of design, whoever were the guilty parties. On the 15th of May, Mary became once more a wife, by giving her hand to the Earl of Bothwell, the man who was universally accused of having been the contriver of the murder of her late husband, and who indeed may be said to have been since proved to have been the author of that crime. We are not perhaps warranted to conclude, as some writers appear to have been inclined to do, from this act alone, taking all circumstances into consideration, either that Mary herself had been a party to the murder, or even that she was cognizant of Bothwell's guilt; but it seems impossible to acquit her of a most indecorous and profligate indifference as to whether he was guilty or no. Her imprudent conduct, to call it by no harsher name, brought its punishment after it, in a life henceforth of almost unmixed trouble and sorrow. She was soon after shut up by her insurgent subjects in the Castle of Loch Leven, where she was compelled on the 24th of June to sign a renunciation of her crown in favour of her infant son. From this imprisonment she made her escape on the 2d of May, 1568, and fled to Hamilton Castle, in Lanarkshire, where she was soon joined by some thousands of her adherents. But the result of the battle of Langside, fought on the 13th, in which her forces were completely defeated by the Regent Murray, suddenly left her again a helpless fugitive. After concealing herself for a few days in the house of Lord Herries in Galloway, she took boat at Kirkcudbright on the 16th, and putting across the Solway landed at Workington in Cumberland. She never again set foot on the soil of her native country. Queen Elizabeth, who, from their relative political position and certain feelings of a more private nature, was her rival and her irreconcilable enemy, had now got her victim within her grasp, and was not the woman to permit her again to escape. Mary had arrived in the English territory in a state of nearly entire destitution, without a shilling in her pocket, or an article of dress except what she wore on her person. After a few days she was conducted by Elizabeth's order to Carlisle, from whence, on the 16th of June, she was removed to Bolton Castle, the house of Lord Scroop, Warden of the West Marches. The honours due to her regal rank were at the same time punctiliously paid to her. Here she remained till the beginning of the next year, when she was transferred to Tutbury Castle in Staffordshire, and committed to the custody of the Earl of Shrewsbury. This continued to be her principal place of confinement during the remainder of her life, although she spent some short periods at Whinfield in Derbyshire, at Chatsworth in the same county, at Coventry, at Sheffield, and other places. In 1584 the Earl of Shrewsbury was succeeded in the office of her gaoler by Sir Drew Drury and Sir Amias Powlet. There seems to be conclusive evidence that Elizabeth, through her ministers, Walsingham and Davison, proposed in almost direct terms to these persons "to find out some way to shorten the life" of their prisoner. They however firmly declined to act upon this atrocious suggestion. "My answer," wrote Sir Amias Powlet, "I shall deliver unto you with great grief and bitterness of mind, in that I am so unhappy as living to see this unhappy day, in which I am required, by direction from my most gracious sovereign to do an act which God and the law forbiddeth. God forbid I should make so foul a wreck of my conscience, or leave so great a blot to my poor posterity, and shed blood without law or warrant." It was then resolved to destroy the unfortunate Queen under the forms of law. In 1585 the Parliament passed an Act declaring that whosoever "should endeavour to raise a rebellion in the kingdom, or attempt the Queen's life, or claimed any right to the crown of England," should be tried by a commission appointed by the Queen, and, if found guilty, put to death. It was well understood by every body, at the time, that this Act was expressly levelled against the Queen of Scots. Accordingly, after her papers had been seized and she had been removed to Fotheringay Castle, on the 25th of September, 1586, forty-two commissioners, with five judges of the realm, were appointed by letters patent under the great seal, on the authority of this Act, to meet at the latter place, to try her on the charge of having been a party to the conspiracy of Antony Babington and his confederates, who, to the number of fourteen, had just been executed for a plot against the Queen's life. Thirty six of the commissioners assembled on the 11th of October, and after various adjournments, pronounced sentence on the 25th, in the Star Chamber at Westminster, against the accused. This trial exhibited perhaps as extraordinary an accumulation of substantial injustice and oppression as was ever witnessed. It was the fit conclusion of an illegal and tyrannical imprisonment of twenty years. Not being a subject of the English Crown, Mary could not be brought to trial on the existing statute of treasons. But just as little surely could she, except by the most outrageous defiance of all reason, be made amenable to the provisions of a new act specially framed to comprehend her case, while she was detained a prisoner in the country by force. Among the most active of her judges were Elizabeth's ministers themselves, Lord Burleigh, Sir Francis Walsingham, and others, the very men who had been labouring for years to effect her destruction, and who, at all events, were the acknowledged originators and directors of the present proceedings. It was not even pretended that any of her jury were her peers. She was allowed no counsel. The letters and other papers, forming the principal evidence upon which she was convicted, were not only all of them the compositions of others, but were not even originals. Of the witnesses, some, such as Babington, had been previously put to death, merely the testimony which had been extracted from them before they suffered being exhibited; others, such as her secretaries, Naue and Curl, although alive, were never confronted with her—their written depositions only being produced. Having obtained her easy object by the verdict of the commissioners, Elizabeth thought it necessary to go through a melancholy farce of dissimulation, without a parallel for elaborate and at the same time transparent artifice. At last, in the midst of her hypocritical lamentations, she affixed her signature to the warrant of execution. She could not at the moment conceal the exultation with which her heart was palpitating. "Go," she said jestingly to Davison, as she delivered him the fatal document, "tell this to Walsingham" (who was then sick), "though I fear he will die for sorrow when he hears it." She afterwards pretended that the execution took place contrary to her intentions; and Davison, whom she and her advisers had made their instrument, suffered severely for the part which he had been befooled to play. The Earls of Shrewsbury, Derby, Kent, and Cumberland, to whom the warrant was directed, arrived at Fotheringay

on the 7th of February, 1587, and immediately informed Mary that she must prepare for death. She heard the announcement with courage and resignation, and asked to have a confessor. Even this favour was not granted; but they offered to send to her Dr. Fletcher, the Dean of Peterborough, whom she refused to see. She then supped, drank to her servants, who pledged her on their knees, perused her will, adding certain bequests, and retired to rest. Having slept some hours she awoke, and spent the rest of the night in prayer. The morning being come she dressed herself in a robe of black velvet, the richest in her wardrobe, and then retired to her oratory, where she remained till the sheriff came to summon her to the scaffold. It was placed at the upper end of the Hall, having set on it a chair, a cushion, and a block covered with black cloth. Here Fletcher began to address her in a violent invective against her religion; but she requested him to desist. He then delivered a prayer; after which the executioner prepared himself to do his office. Her women having removed the upper part of her dress, Mary knelt down and laid her head on the block, when the executioner at two strokes severed it from her body. By the testimony of all who were present, her bearing, at this her last hour, was in all respects becoming and magnanimous. We ought also to have mentioned that, addressing the crowd who stood around, she solemnly declared her innocence both of the murder of Darnley, and of any participation in Babington's conspiracy against the life of Elizabeth.



[Portrait of Queen Mary.]

ADDRESS TO THE MUMMY IN BELZONI'S EXHIBITION.

And thou hast walk'd about (how strange a story!)
In Thebes's streets three thousand years ago,
When the Memnonium was in all its glory,
And time had not begun to overthrow
Those temples, palaces, and piles stupendous,
Of which the very ruins are tremendous.

Speak! for thou long enough hast acted Dummy,
Thou hast a tongue—come let us hear its tune;
Thou'rt standing on thy legs, above ground, Mummy!
Revisiting the glimpses of the moon,
Not like thin ghosts or disembodied creatures,
But with thy bones and flesh, and limbs and features.

Tell us—for doubtless thou canst recollect,
To whom should we assign the Sphinx's fame?
Was Cheops or Cephrenes architect
Of either pyramid that bears his name?
Is Pompey's pillar really a misnomer?
Had Thebes a hundred gates, as sung by Homer?

Perhaps thou wert a mason, and forbidden
By oath to tell the mysteries of thy trade,
Then say what secret melody was hidden
In Memnon's statue which at sunrise play'd?
Perhaps thou wert a priest—if so, my struggles
Are vain, for priestcraft never owns its juggles.

Perchance that very hand, now pinion'd flat,
Has hob-a-nobb'd with Pharaoh glass to glass;
Or dropp'd a halfpenny in Homer's hat,
Or doff'd thine own to let Queen Dido pass;
Or held, by Solomon's own invitation,
A torch at the great Temple's dedication.

I need not ask thee, if that hand, when arm'd,
Has any Roman soldier maul'd and knuckled,
For thou wert dead, and buried, and embalm'd,
Ere Romulus and Remus had been suckled:—
Antiquity appears to have begun
Long after thy primeval race was run.

Since first thy form was in this box extended,
We have above ground seen some strange mutations;
The Roman empire has begun and ended,
New worlds have risen—we have lost old nations,
And countless kings have into dust been humbled,
While not a fragment of thy flesh has crumbled.

Didst thou not hear the pother o'er thy head,
When the great Persian conqueror, Cambyses,
March'd armies o'er thy tomb with thundering tread,
O'erthrew Osiris, Orus, Apis, Isis,
And shook the pyramids with fear and wonder,
When the gigantic Memnon fell asunder?

If the tomb's secrets may not be confess'd,
The nature of thy private life unfold:—
A heart has throbb'd beneath that leathern breast,
And tears adown that dusky cheek have roll'd:
Have children climb'd those knees and kiss'd that face?
What was thy name and station, age and race?

Statue of flesh—immortal of the dead!
Imperishable type of evanescence!
Posthumous man, who quitt'st thy narrow bed,
And standest undecay'd within our presence,
Thou wilt hear nothing till the Judgment morning
When the great trump shall thrill thee with its warning.

Why should this worthless tegument endure,
If its undying guest be lost for ever?
O let us keep the soul embalm'd and pure
In living virtue, that when both must sever,
Although corruption may our frame consume,
The immortal spirit in the skies may bloom.

New Monthly Magazine.

ON THE DEATH OF A FRIEND.

Friend after friend departs;
Who hath not lost a friend?
There is no union here of hearts
That finds not here an end;
Were this frail world our final rest,
Living or dying none were blest.

Beyond the flight of time,—
Beyond the reign of death,—
There surely is some blessed clime
Where life is not a breath;
Nor life's affections, transient fire,
Whose sparks fly upwards and expire.

There is a world above,
Where parting is unknown;
A long eternity of love,
Form'd for the good alone;
And faith beholds the dying, here,
Translated to that glorious sphere!

Thus star by star declines,
Till all are past away;
As morning high and higher shines,
To pure and perfect day;
Nor sink those stars in empty night,
But hide themselves in heaven's own light.

Montgomery.

. The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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CHARMERS OF SERPENTS.



[Indian Jugglers exhibiting tamed Snakes.]

There are several passages in Scripture which allude to the commonly-received opinion in the East, that serpents are capable of being rendered docile, or at least harmless, by certain charms or incantations. The most remarkable of these texts is that of the 58th Psalm, where the wicked are compared to "the deaf adder that stoppeth her ear, which will not hearken to the voice of charmers, charming never so wisely;" and that of the 8th chapter of Jeremiah, "I will send serpents, cockatrices, among you, which will not be charmed." Dr. Shaw says that a belief that venomous serpents might be rendered innoxious by songs or muttered words, or by writing sentences or combinations of numbers upon scrolls of paper, prevailed through all those parts of Barbary where he travelled. In India, at the present day, the serpent-charmers are a well-known division of the numerous caste of jugglers that are found in every district. Mr. Forbes, in his 'Oriental Memoirs,' appears to attach some credit to their powers of alluring the *Cobra-di-Capello*, and other snakes, from their hiding-places, by the attraction of music. Mr. Johnson, however, in his 'Sketches of India Field Sports,' says, "The professed snake-catchers in India are a low caste of Hindoos, wonderfully clever in catching snakes, as well as in practising the art of legerdemain: they pretend to draw them from their holes by a song, and by an instrument somewhat resembling an Irish bagpipe, on which they play a plain tive tune. The truth is, this is all done to deceive. If ever a snake comes out of a hole at the sound of their music, you may be certain that it is a tame one, trained to it, deprived of its venomous teeth, and put there for the purpose; and this you may prove, as I have often done, by killing the snake, and examining it, by which you will exasperate the men exceedingly."

The account of Mr. Johnson certainly appears the more probable version of this extraordinary story; yet enough remains to surprise, in the wonderful command which these people possess over the reptiles that they have deprived of their power of injury, and taught to erect themselves and make a gentle undulating movement of the head, at certain modulated sounds. There can, we think, be no doubt that the snake is taught to do this, as the bear and the cock of the Italians are instructed to dance, as described in our last number. The jugglers are very expert in the exercise of the first branch of the trade, that of catching the snakes. They discover the hole of the reptile with great ease and certainty, and digging into it, seize the animal by the tail, with the left hand, and draw the body through the other hand with extreme rapidity, till the finger and thumb are brought up to the head. The poisonous fangs are then removed, and the creature has to commence its mysterious course

of instruction. According to Mr. Johnson, however, the business of the snake-charmer is a somewhat perilous one. In catching the reptiles, they are generally provided with a hot iron to sear the flesh, should they be bitten; and the following anecdote, given by Mr. Johnson, would show that the danger is not completely avoided, even when the venomous fangs are removed:—"A man exhibited one of his dancing *cobra-di-capellos* before a large party. A boy about sixteen years old was teasing the animal to make it bite him, which it actually did, and to some purpose, for in an hour after he died of the bite. The father of the boy was astonished, and protested it could not be from the bite; that the snake had no venomous teeth; and that he and the boy had often been bitten by it before, without any bad effect. On examining the snake, it was found that the former fangs were replaced by new ones, not then far out of the jaw, but sufficient to bite the boy. The old man said that he never saw or heard of such a circumstance before."

MUTUAL INSTRUCTION.

The following account of a Literary Society, the members of which belong to the working class, is condensed from a paper addressed to the proprietors of large manufactories by the Secretary of the Glasgow Chamber of Commerce.

It is justly remarked by this gentleman that the mere acquisitions of reading and writing only serve to open the door to knowledge; and, unless we are induced to pass the portal, the stores which lie within will still remain useless to us. No efforts, however assiduous, for acquiring intellectual treasures in the exercise of our mental powers, can be so successful or satisfactory as where men unite together to grapple with ignorance, and mutually to instruct each other. The formation of societies for this purpose cannot be too strongly recommended. An account of such an institution formed in Glasgow for the improvement of a single body of workmen will strongly illustrate these remarks.

The Gas Light Chartered Company of that city constantly employs between sixty and seventy men in the works; twelve of these are mechanics, and the others furnace-men and common labourers of different descriptions. In 1821 the manager of the works proposed to these men to contribute each a small sum monthly, to be laid out in books to form a library for their common use. He informed them that if they agreed to this, the Company would give them a room to keep the books in, which should be heated and lighted for them in winter; that in this room they might meet every evening throughout the whole year to read and converse, in place of going to the alehouse, as many of them had been in the practice of doing; that the Company would further give them a present of five guineas to expend on books; and that the management of every thing connected with the measure should be intrusted to a committee of themselves, to be named and renewed by them at fixed periods. Fourteen of the workmen were induced to agree to the plan. A commencement was thus made. For the first two years, until it could be ascertained that the members would take proper care of the books, it was agreed that they should not remove them from the reading-room, but that they should meet there every evening to peruse them. After this period, however, the members were allowed to take the books home; and they then met only twice a week at the reading-room, to change them, and converse upon what they had been reading. The increase of the number of the subscribers to the library was at first very slow, and at the end of the second year the whole did not amount to thirty. But from conversing twice a week with one another at the library upon the acquisitions they had been making, a taste for science and a desire for information began to spread among them. They had, a little before this time, obtained an Atlas, which, they say, led them to think of a pair of Globes. One of their members, by trade a joiner, who had had the advantage of attending two courses of lectures in the Andersonian Institution, volunteered, on the third year after the formation of the society, to explain to its members the use of the globes. This he did one evening in every week, and succeeded so well that he offered on the other meeting in the week to give an account of some of the principles and processes in mechanics and chemistry, accompanied with a few experiments. He next, and while he was still going on with his lectures, undertook, along with another of the workmen, to attend in the reading-room during the other evenings in the week, and teach arithmetic to such of the members as chose. The society now made very rapid progress, and its members were induced to make a new arrangement by which the labour of instructing was more equally divided.

The individuals of the committee agreed among themselves to give in rotation a lecture either on chemistry or mechanics every Thursday evening, taking Murray for their text-book in the one, and Fergusson in the other. The plan is still pursued. It is intimated a fortnight before to the person whose turn it is, that he is to lecture from such a page to such a page of one of these authors. He has in consequence these fourteen days to make himself acquainted with the subject; and he is authorized to claim, during that period, the assistance of every member of the society in preparing the chemical experiments, or making the little models of machines for illustrating his discourse.

It is a remarkable circumstance in this unique process of instruction, that there has been no backwardness found on the part of any of the individuals to undertake to lecture in his turn, nor the slightest diffidence exhibited in the execution. This is attributed solely to its being set about without pretension or affectation of knowledge, and merely as a means of mutual improvement.

On the Monday evenings the society has a voluntary lecture from any one of its members who chooses to give notice of his intention, on either of the branches of science already mentioned, or upon any other useful subject he may propose. And there is with the general body the same simple unhesitating frankness, and disposition to come forward in their turn, that exist among the members of the committee with regard to the lectures prescribed to them. It may be interesting as well as useful to mention some of the subjects of the different lectures that were given during the first three months after this plan was adopted. Those delivered by the members of the committee consisted of eleven on mechanics, including the application of the mechanical powers; one on magnetism and electricity; one on wheel carriages; one on the primitive form of crystals; and one on hydrostatics. The voluntary lectures treated on the air-pump, chemistry, &c., besides many practical subjects, such as boring and mining; Sir Humphrey Davy's lamp; the construction of a corn-mill; and a description of Captain Manby's invention for the preservation of shipwrecked seamen.

The effect of this society was soon found to be most beneficial to the general character and happiness of the individuals composing it. It may readily be conceived what a valuable part of the community the whole of our manufacturing operatives might become if the people employed in every large work were enabled to adopt similar measures. What might we not then be entitled to look for, in useful inventions and discoveries, from minds awakened and invigorated by the self-discipline which such a mode of instruction requires.

The Gas Company being fully aware of the beneficial consequences resulting from the instruction of their workpeople, fitted up for their use, in the latter end of 1824, a

more commodious room for their meetings, with a small laboratory and workshop attached to it, where the experiments are conducted, and the models to be used in the lectures are prepared. Previously to this time the men had made for themselves an air-pump and an electrifying machine, and some of them are constantly engaged in the laboratory and workshop during their spare hours. At the end of three years from its commencement the whole of the workmen, with the exception of about fifteen, became members of the society, and these were withheld from joining in consequence of their inability to read. The others said to them, "Join us and we will teach you to read." It is gratifying to know that this invitation has not been made in vain; and that at the present time this association, now amounting to upwards of seventy persons, comprehends nearly all those employed about the works.

The Rules of the society, which have been framed by the members themselves, are simple and judicious. Every person on becoming a member pays seven shillings and sixpence of entrance money. This sum is taken from him by instalments, and is paid back to him should he leave the gas works, or to his family or heirs should he die. Besides this entrance money, each member contributes three halfpence weekly, two-thirds of which go to the library, and one-third to the use of the laboratory and workshop. The weekly lectures are continued during the winter months, and the members are permitted to bring to these any of their sons who are above seven and under twenty-one years of age. Additions have from time to time been made to the chemical and mechanical apparatus, and the library now contains seven hundred volumes.

A SABBATH IN THE WILDERNESS.

[The following paper is a continuation of those inserted in Nos. 51 and 52, under the title of 'a Party of Emigrants travelling in Africa.']

We were placed on our location, near the source of the Baviaan's River, on the 29th June: next day we were visited by Captain Harding, the magistrate of the district, and formally installed in our new possessions. By the advice of this officer, we resolved to place a nightly watch, to guard our camp from any sudden attack that might be attempted by Caffer or Bushman marauders; and as Captain Harding considered our position to be a very exposed one, we agreed to continue, at least for the first season, in one body, and to erect our huts and cultivate our crops in one spot, for the sake of common security and mutual help.

The day following we made a complete tour of our united domain, to which we gave the Scottish name of Glen-Lynden—an appellation afterwards extended to the whole valley of "Baviaan's River." We erected temporary land-marks to divide the allotments of the different families; and in our progress started a good deal of wild game, quaggas, hartebeestes, rietboks, oribis, and two wild boars, one of which we killed; but we saw no beast of prey, except a solitary jackal.

The next day, July 2d, was our first Sunday on our own grounds. Feeling the high importance of strictly maintaining the suitable observance of this day of sacred rest, it was unanimously resolved that we should abstain from all secular employment not sanctioned by absolute necessity; and at the same time commence such a system of religious services as might be with propriety maintained in the absence of a clergyman or minister. The whole party were accordingly assembled after breakfast, under a venerable acacia tree, on the margin of the little stream which murmured pleasantly beneath. The river appeared shaded here and there by the graceful willow of Babylon, which grows abundantly along the banks of the African streams, and which, with the other peculiar features of the scenery, vividly reminded us of the beautiful lament of the Hebrew exiles:—"By the rivers of Babylon, there we sat, yea we wept when we remembered Zion. We hanged our harps upon the willows in the midst thereof."

'It was, indeed, an affecting sight to look round on our little band of Scottish exiles, thus congregated for the first time to worship God in the wild glen allotted for their future home and the heritage of their offspring. There sat old ——, with his silvery locks, the patriarch of the party, with his Bible on his knee,—a picture of the grave, high-principled Scottish husbandman; his respectable family seated round him. There was the widow ——, with her meek, kind, and quiet look—like one who had seen better days, but who in adversity had found pious resignation, with her three stalwart sons and her young maiden daughter placed beside her on the grass. There was Mr. ——, with his two servant lads, the younger brother of a Scottish laird, rich in blood, but poor in fortune, who, with an estimable pride, had preferred a farm in South Africa, to a humiliating dependence on aristocratic connexions at home. There, too, were others still more nearly related to the writer of this little sketch—the nominal head of the party. Looking round on these collected groups, on this solemn day of assemblage, such reflections as the following irresistibly crowded on his mind: "Have I collected from their native homes, and led forth to this remote corner of the globe, all these my friends and countrymen, for good or for evil?—to perish miserably in the wilderness, or to become the honoured founders of a prosperous settlement, destined to extend the benefits of civilization and the blessed light of the Gospel through this dark and desolate nook of benighted Africa? The issue of our enterprise is known only to Him who ordereth all things well: 'Man proposes, but God disposes.' But though the result of our scheme is in the womb of futurity, and although it seems probable that greater perils and privations await us than we had once calculated upon, there yet appears no cause to repent of the course we have taken, or to augur unfavourably of the ultimate issue. Thus far Providence has prospered and protected us. We left not our native land (deeply and dearly loved by us) from wanton restlessness or mere love of change, or without very sufficient and reasonable motives. Let us, therefore, go on calmly and courageously, duly invoking the blessing of God on all our proceedings; and thus, be the result what it may, we shall feel ourselves in the path of active duty."—With these, and similar reflections, we encouraged ourselves, and proceeded to the religious services of the day.

Having selected one of the hymns of our national church, all united in singing it to one of the old pathetic sacred melodies with which it is usually conjoined in the sabbath worship of our native land. The day was bright and still, and the voice of praise rose with a sweet and touching solemnity among those wild mountains, where the praise of the true God had never, in all human probability, been sung before. The words of the hymn (composed by Logan) were appropriate to our situation and our feelings, and affected some of our congregation very sensibly:—

"O God of Bethel! by whose hand thy people still are fed;
Who through this weary pilgrimage hast all our fathers led:
Through each perplexing path of life our wandering footsteps guide;
Give us each day our daily bread, and raiment fit provide:
O! spread thy covering wings around, till all our wanderings cease,
And at our Father's loved abode our souls arrive in peace."

We then read some of the most suitable portions of the English Liturgy, which we considered preferable to any extempore service that could be substituted on this occasion; and concluded with an excellent discourse

from a volume of sermons, by a friend well known and much esteemed, the late Dr. Andrew Thomson, of Edinburgh.

We had a similar service in the afternoon; and agreed to maintain in this manner the public worship of God in our little settlement, until it should please Providence again to favour us with the regular dispensation of our holy religion.

While we were singing our last psalm in the afternoon, a roebuck antelope, which appeared to have wandered down the valley, without previously observing us, stood for a little while on the opposite side of the stream, gazing at us in innocent amazement, as if yet unacquainted with man, the great destroyer. On this day it was, of course, permitted to depart unmolested.

On this and other occasions the scenery and productions of the country reminded us in the most forcible manner of the striking imagery of the Hebrew Scriptures. The parched and thorny desert—the rugged and stony mountains—the dry beds of torrents—"the green pastures by the quiet waters"—"the lions' dens"—"the mountains of leopards"—"the roes and the young harts (antelopes) that feed among the lilies"—"the cony of the rocks"—"the ostrich of the wilderness"—"the shadow of a great rock in a weary land;"—these, and a thousand other objects, with strikingly appropriate descriptions which accompany them, reminded us continually with a sense of their beauty and aptitude, which we had never fully felt before.

P.

VIRGINIA WATER.



[Fishing Temple on the Lake.]

THE district of Windsor Forest called Virginia Water was planted, and the Lake formed, under the direction of Paul Sandby, at a time when Duke William of Cumberland resided at the Lodge which bears his name, about three miles from Windsor. The lake is the largest piece of artificial water in the kingdom; if artificial it can be called—for the hand of man has done little more than turn the small streams of the district into a natural basin. The grounds are several miles in extent; although so perfectly secluded that a traveller might pass on the high road without being aware that he was near any object that could gratify his curiosity. They are now covered with magnificent timber, originally planted with regard to the grandest effects of what is called landscape gardening. By the permission of the King, Virginia Water is open to all persons; and by those residents in London who can spare the time and expense for such an excursion, a fine day of the approaching spring or summer could not be better spent, than in rambling through the most romantic district within a hundred miles of the metropolis.

The scenery in the neighbourhood of Virginia Water is bold and rugged; being the commencement of Bagshot Heath. The variety of surface here agreeably relieves the eye, after the monotony of the first twenty miles from town, which equally fatigues the traveller either upon the Bath or western road. About two miles beyond the town of Egham is a neat inn, the Wheatsheaf. From the garden of this inn there is a direct access to the lake. But we would advise the traveller to take a more circuitous course of viewing it if he have time. A few hundred yards above the inn, is a branch road to the right, which leads to a remarkably pretty village called Blacknest, nearly two miles from the high road from which we recommended him to diverge. Here is a keeper's lodge; and the persons at the gate will readily give admission to Virginia Water. After passing through a close wood of pines we come to some "alleys green," which lead in different directions. Those to the right carry us up a steep hill, upon the summit of which is a handsome building called the Belvedere. Those to the left conduct to the margin of the lake. A scene of great

beauty soon bursts upon the view. A verdant walk, bounded by the choicest evergreens, leads by the side of a magnificent breadth of water. The opposite shore is covered with heath; and plantations of the most graceful trees—the larch, the ash, and the weeping birch, ("the lady of the woods,") break the line of the more distant hills. The boundary of the lake is every where most judiciously concealed;—and the imagination cannot refrain from believing that some great river lies beyond that screening wood. Every now and then the road carries us through some close walk of pines and laurels, where the rabbit and squirrel run across with scarcely a fear of man. But we again find ourselves upon the margin of the lake, which increases in breadth as we approach its head. At the point where it is widest, a fishing temple was erected by George IV.; which, as seen from the shore we are describing, is represented in the woodcut at the head of this article.

The public road to Blacknest is carried over a bold arch which is not far out of the line of our walk. This is a singularly beautiful spot. To our minds it is not now so much in accordance with the general character of the scenery, as it was some ten years ago. Several antique fragments of Greek columns and pediments, that used to lie in the court-yard of the British Museum, now form an artificial ruin, as represented in the wood-cut. *Real ruins* removed from the sites to which they belong, are the worst species of exotics. The tale which they tell of their old grandeur is quite out of harmony with their modern appropriation. We can look with an antiquarian interest upon a capital in a cabinet. But a shaft or two perched up in a modern pleasure-ground, produces a ludicrous struggle between the feeling of the true and the artificial; and a sort of scorn of the vanity which snatches the ruins of the dead from the hallowed spot where time or the barbarian had crumbled them into nothingness, to administer to a sense of what is pretty and *merely* picturesque. A *real* ruin is a solemn thing, when it stands upon the site where it had defied the elements for centuries, in its pomp and glory; but a mock ruin—a fiction of plaster and paint, or a collection of fragments brought over sea to be joined together, without regard to differences of age and style—are baubles.



[Dry Arch, under the road to Blacknest.]

A walk from this spot of a quarter of a mile brings us to the cascade at the head of the lake. Cascades are much upon the same plan, whether natural or artificial; the scale alone makes the difference. This cascade is sufficiently large not to look like a plaything; and yet it gives but an imperfect notion of a fine natural cascade. It wants height, and volume of water. In the latter particular of excellence, however, the grandest cascades are often very disappointing. After a mountain-storm when the *gills* (little runnels) sparkle down the sides of the barren rocks, and the *force* leaps over some fearful chasm in one unbroken sheet, cascades are worthy of the poetical descriptions which have been so often lavished upon them. In other seasons they appear very feeble additions to the charms of the mighty lakes and solemn mountains amidst whose solitudes they are found.

From the bottom of the cascade a road has been formed to the bank of the lake, opposite that which we have been describing. The walks here are as verdant and as beautiful as those we have left. We reach a rustic bridge, and cross one of the streams that feed the lake. Here we are in a more wild and open country. We may trace the course of the little stream amongst the underwood; or strike into the path which leads to the village of Bishopgate. The finest woodland scenery, and spots of the most delicious seclusion, where nothing is heard on a summer noon but that indescribable bus

with which every lover of solitude is familiar, will amply repay for a lingering hour. Bishopgate is a beautiful spot, surrounded by the most delightful varieties of hill and dale, of wood and water. The poet Shelley, who had a true eye for the picturesque, resided for some time here. The Royal Lodge, which was close by, (the favourite retreat of George IV.) is now pulled down. The common road from Bishopgate to Windsor is through that vista of magnificent elms, the Long Walk. There is a more secluded horse-road, which affords some exquisite views of the Castle, and many forest scenes of striking beauty.

SIMPLIFICATIONS OF ARITHMETICAL RULES.

No. 2.

We now suppose the attentive reader to have practised the rule given in No. 1 of this series, where any number of shillings, pence, and farthings is converted into the corresponding number of thousandths of a pound. We proceed to a rule for finding how much a year a given sum per week will amount to. The rule will be correct within eighteen-pence, which in such a matter is sufficient for every-day purposes.

Suppose a man to gain £1. 15s. 7½d. per week, and we want to find how much this is a year. Convert this sum, as in the last number, which gives 1781. First annex two ciphers to 1781, and divide by 2, which gives 89050; then multiply 1781 by 2, which gives 3562. Add these together—

89050
3562
92612

From the right of which cut off three places; let the figures which remain on the left be the pounds, and convert those which were cut off into shillings and pence, as in the last number. This gives £92. 12s. 3d. The correct answer is £92. 12s. 6d. Again, let 11s. 3¾d. be the weekly sum. This converted, gives 565; proceed as before, that is, take the half of 56500 and twice 565, and add, which gives 29380, and 29/380 converted gives £29. 7s. 7½d. The real answer is £29. 8s. 3d.

We now take the converse question, to find how much a week will come from a given sum per year. Let the yearly sum be £29. 8s. 3d. Reject the shillings and pence, reserving one farthing for every shilling so rejected, to be applied as hereafter shown. Multiply the pounds by 2, which gives 58. Annex two ciphers to 58, giving 5800; multiply 58 by 4, giving 232. Subtract the second from the first—

5800
232
5568

Cut off four places thus /5568, which, in this case, cuts off all the figures, and convert this into pounds, shillings, and pence, (in this case there are no pounds,) which gives 11s. 1½d. Now add the 8 reserved farthings, which gives 11s. 3½d., within a farthing of the truth, as appears by the last question. If the result contains any pounds, it may be made more correct by adding a farthing and a half for every pound. Suppose, for example, that we ask how much £312 per year gives per week. We have chosen this example because the answer ought to be exactly £6, from which we may judge what degree of correctness our rule gives. The process is as follows:—

	312
	2
	62400
Subtract 4 times 624	2496
	59904

And 5/9904 gives £5. 19s. 9¾d. If we add a farthing and a half for each of the 5 pounds, or add 1¾d. (rejecting the half farthing), we have £5. 19s. 11½d.; and if we had observed that the answer is very nearly 6 pounds, and had added a farthing and a half more, retaining the half farthing which we just now rejected, we should have had an exact result.

We would recommend the reader who studies the principles of algebra, to endeavour to ascertain the reason for this rule.

THE HERRING FISHERY.

There are few fish of which the supply is more abundant, or for which the demand is more considerable, than the herring. It affords a cheap means of subsistence to the population of our sea-coasts; and, although prejudices are often entertained by many persons against the use of fish, we believe that, if not eaten to excess, the herring is both nutritious and wholesome. The Dutch consider it to be highly so, and a fresh herring early in the season is esteemed in Holland almost as a panacea for all disorders.

Herrings are found from the highest northern latitudes as low as the northern coast of France. Their great winter rendezvous is within the Arctic Circle, where they continue for many months in order to recruit themselves after the fatigues of spawning, as the seas within that circle swarm with insect food in a far greater degree than those of the warmer latitudes. They begin to appear off the Shetland Isles in April and May; but the great shoal does not arrive till June. Their advance is marked by the approach of numerous birds of prey. The main body is so broad and deep as to alter the appearance of the very ocean; it is divided into columns of five or six miles in length, and three or four in breadth, and they drive the water before them with a kind of rippling. Sometimes they sink for ten or fifteen minutes and then rise again to the surface; and in fine weather they reflect a variety of splendid colours, like a field of the most precious gems.

In the account of the herring in Pennant's British Zoology, it is conjectured that the instinct of migration was given to herrings that they might deposit their spawn in warmer seas, that would mature and vivify it more assuredly than those of the frozen zone. This is the more probable, because they come to us full of fat, and on their return are almost universally observed to be lean. What their food is near the Pole is not well known, but in our seas they feed much on the *oniscus marinus*, a crustaceous insect, and sometimes on their own fry. At the end of June they are full of roe, and continue in perfection till the beginning of winter, when they deposit their spawn. The young herrings begin to approach the coast in July and August, and are then about two inches long. According to Pennant, the annual shoal of herrings is first divided in its course southward by the Shetland Islands; on meeting which, one wing takes to the eastern, the other to the western shores of Great Britain, each separate shoal being guided by a leader of larger size than the ordinary fish. Those which take towards the west, after offering themselves to the Hebrides, where the great stationary fishing is, proceed to the north of Ireland, when they meet with a second interruption, and are obliged to make a second division; the one takes to the western side, and is scarcely perceived, being soon lost in the Atlantic, but the other, which passes into the Irish Sea, feeds the inhabitants of most of the coasts that border on it. The divisions, however, are capricious in their motions, and do not show an invariable attachment to their haunts.

The importance of the British herring fishery, as a branch of industry, has been thought by some to have been much overrated; and Mr. M'Culloch has remarked

that the exaggerated estimates that have been current with respect to the extent and value of the Dutch fishery have contributed very much to the diffusion of false notions on this head. He doubts whether the Dutch fishery ever afforded employment to more than 50,000 individuals; although the Encyclopædia Britannica has stated the number employed at 450,000. Various attempts have been made to extend the British fishery by bounties; and to so extravagant a pitch was this system at one period carried, that in the year 1759 the almost incredible sum of £159. 7*s.* 6*d.* was paid as a bounty upon every barrel of merchantable herrings that was produced; and, as Adam Smith says, vessels were consequently sent out not to catch herrings, but to catch the bounty. The system of bounties, however, was brought to an end in the year 1830; and the supply will henceforth be proportionate to the real demand, which will ultimately be more advantageous to the public, more especially as the repeal of the salt duties must be of signal service to all the fisheries. According to the last official account, being for the year ended 5th of April, 1830, the total quantity of herrings cured in Great Britain was 329,557 barrels, and that exported was 181,654 barrels, of which 89,680 went to Ireland, 67,672 to places out of Europe (chiefly the West Indies), and 24,302 to places in Europe other than Ireland.

The invention of pickling herrings is ascribed to one Beukels, a Dutchman, who died in 1397. His grave was visited by the Emperor Charles V., and a magnificent tomb was erected by that prince to his memory. The Dutch have always maintained their ascendancy in the fishery, but the consumption on the Continent is now far less than in the middle ages. This may be attributable to the Reformation, and the relaxed observance of Lent, or perhaps in some degree to the effect of habit and fashion. The herring is the *Clupea harengus* in the language of Linnæus, and is too familiar to require description. Its power of procreation is most extraordinary. The fish is supposed to be best when shotten, as it is termed; that is, after having parted with its roe. The young roe is soft and pulpy, and when older becomes hard and seedy. The night is said to be more favourable than the day for the herring fishery. There is an expression, "pickle-herring," used by some writers as meaning a jack-pudding, or merry-andrew, the origin or precise application of which does not appear to be noticed by lexicographers.

The Mouse.—About eight years ago, being in the daily habit of descending into the coal-mines of the Newcastle district, I one day caught a half-grown mouse, at the extremity of a gallery into which the little animal had retreated as I advanced towards it (a situation, by the way, in which I have seen a rat, by which the mines are also infested, turn round and attack a boy). Now, as no cat had up to that period been introduced into the mine, I determined to carry home my prisoner, for the purpose of observing his deportment on being brought into the presence of his formidable and natural enemy. In order, however, that he might regain his self-possession after being introduced to the light of day, which in all probability he had never seen before, I kept him confined in a glass lantern for a few days, where he soon became so tame as to eat in my presence. In order that he might enjoy a more extensive view of surrounding objects, I fixed a piece of stick about nine inches long into the socket of the lantern upon which the little fellow very soon mounted; and after finishing his meals, he usually amused himself on his perch, by licking all the accessible parts of his body. In this way he was engaged, on the fifth or sixth day of his capture, when I introduced a young cat into the room: she very soon discovered the lantern and its contents, which was placed on a table, and dashed at it with all the ferocity of a tiger. To my surprise and amusement, my youthful prisoner continued his ablutions with all the coolness imaginable, without even condescending to notice the furious efforts of the cat to break the glass and devour him. This experiment was frequently renewed for the amusement of my friends, and invariably with the same results. Shortly afterwards I carried the little animal again into the coal-mine, and set him free. It must be obvious that the mouse could not be aware that the glass of the lantern afforded him a sufficient protection; it did appear to me at the time, that he had no natural or instinctive dread of the cat.—(*From a Correspondent.*)

LADY JANE GREY.

The 12th of February is the anniversary of the execution of the young and interesting Lady Jane Grey. This unfortunate lady was born in the year 1537. It was her unhappy lot to be nearly allied to the blood-royal of England, through her mother, who was the daughter of Mary, the youngest sister of Henry VIII., and the wife first of Louis XII. of France, and after his death of Charles Brandon, Duke of Suffolk. By the latter she had a daughter Frances, who married Henry Grey, Marquis of Dorset, and thus became the mother of the subject of the present notice, and of two younger daughters. When by the death of his wife's two brothers, without issue, in 1551, of what was called the sweating sickness, the Dukedom of Suffolk, created in favour of Charles Brandon, had become extinct, the Marquis of Dorset was advanced to that title, through the influence of the noted John Dudley, Earl of Warwick, who was then in the height of his power, and who at the same time obtained for himself the dignity of Duke of Northumberland. The scheme of this ambitious politician was to secure the crown for his own descendants by marrying his fourth son Lord Guilford Dudley to Lady Jane Grey, and then getting his royal master, Edward VI., over whom he possessed a complete ascendancy, and the probability of whose early death he seems to have already foreseen, to declare that lady his successor. Up to a certain point this project succeeded. In May, 1553, the young pair, between whom there is understood to have existed a warm attachment, were united at Durham House, the residence of the bridegroom's father, which stood on the site of the present Adelphi buildings. The King, who had been for some time ill, was already looked upon as past recovery; and on the 11th of June he was persuaded by Northumberland to send for several of the judges, and to desire them to draw out an assignment of the crown in favour of Lady Jane. That day they refused to obey this command; but on the 15th they complied; and on the 21st the document was signed by all the members of the Privy Council, twenty-one in number. Edward died on the 6th of July, which seems to have been rather sooner than was expected; and, in consequence, Northumberland, not having yet every thing in readiness, attempted for a few days to conceal the demise of the crown. At length, on the 9th, he proceeded along with the Duke of Suffolk to Durham House, where Lady Jane was, and announced to her the royal dignity to which she had become heir. At first she firmly refused to accept what she maintained belonged to another; but the entreaties of her father, and especially those of her husband, finally prevailed upon her to consent that she should be proclaimed Queen She was accordingly proclaimed in London on the following day, having previously, under the direction of her father-in-law, withdrawn to the Tower, whither she was accompanied by all the Privy Council, whom the Duke was especially anxious to retain at this juncture under his immediate control. But all his efforts and precautions proved insufficient to compass the daring plot in which he had engaged. The pretensions of Lady Jane to the crown were so perfectly untenable according to all the ordinary and established rules of succession, that the nation was nearly unanimous in regarding her assumption of the regal authority as a usurpation. Her reign, if it

is to be so called, lasted only for nine days. Her authority, as soon as it was questioned, was left without a single supporter. On the 19th the Council having contrived to make their escape from the Tower, while Northumberland had gone to endeavour to oppose Mary in Cambridgeshire, met at Baynard's Castle, in the city, the house of the Earl of Pembroke, and sending for the Lord Mayor unanimously desired him to proclaim that princess, which he did immediately. Mary's accession then took place without opposition; and she arrived in London on the 3d of August. The consequences, however, of the extraordinary attempt which had just terminated in so signal a failure, were now about to fall with fatal effect both upon the guilty authors of the conspiracy, and upon the innocent young creature whom they had made the instrument of their ambition. Orders were issued that both Lady Jane and her husband should be shut up in the Tower. On the 18th of August the Duke of Northumberland was tried and condemned to death; and on the 22d he was executed. On the 13th of November, Lady Jane, her husband, two of her brothers-in-law, and Archbishop Cranmer, were all brought to trial, and sentence of guilty pronounced against them. Instead, however, of being put to death immediately, they were remanded to prison; and no further steps were taken in regard to any of them till after the occurrence and suppression of the rash insurrection, headed by Sir Thomas Wyatt in the beginning of the following February. Wyatt himself suffered death for his share in this affair, as did also the Duke of Suffolk and his brother; and "above fifty gallant officers, knights, and gentlemen," says the historian Carte, "were put to death as soon as the rebellion was quelled. * * There were above four hundred common men executed before March 12; how many suffered afterwards does not appear." But among all who perished in this enormous carnage there were none whose fate was so much lamented at the time, or has been so long remembered, as the young, beautiful, and accomplished Lady Jane Grey. On the morning of the same day her husband had been executed on the scaffold on Tower Hill (to the north-west of the Tower, at a short distance from the moat); and she had beheld his mangled corpse as it was carried back to the chapel, within the fort. She herself was soon after led out to suffer the same bloody death on the green in front of the chapel. She advanced with a book in her hand and with a composed countenance. Having mounted the scaffold, she then addressed the people, acknowledging the unlawfulness of her assumption of the crown, but declaring fervently her innocence of any part "in the procurement and desire thereof." She concluded by requesting the people to assist her with their prayers, and then knelt down and devoutly repeated one of the psalms. Having arisen, she declined the assistance of the executioner, who approached to remove the upper part of her dress, and that service was performed by her female attendants, who also bound her eyes. Being then guided to the block, and having requested the executioner to dispatch her quickly, she knelt down, and, exclaiming "Lord, into thy hands I commend my spirit," received the fatal stroke. Her demeanour was throughout touchingly resigned and beautiful, and altogether in harmony with the gentle tenor of her whole previous life. Lady Jane Grey, who was thus cut off before she had completed her seventeenth year, was already one of the most accomplished and erudite of her sex in an age abounding in learned females. She is said to have been a perfect mistress of the French, Latin, and Greek languages. Roger Ascham, in his 'Schoolmaster,' relates that, visiting her upon one occasion at her father's seat in Leicestershire, he found her reading the Phaedon of Plato in the original, while the rest of the family were all engaged in some field amusements in the parks. "I wis, all their sport," she exclaimed, "is but a shadow to the pleasure that I find in Plato." "One of the greatest benefits that God gave me," she afterwards remarked, as they continued the conversation, "is that he sent me so sharp and severe parents, and so gentle a schoolmaster; for when I am in presence either of father or mother, whether I speak, keep silence, sit, stand or go, eat, drink, be merry or sad, be sewing, playing, dancing, or doing any thing else, I must do it, as it were, in such measure, weight, and number, even so perfectly as God made the world, or else I am so sharply taunted so cruelly threatened—yea, presently sometimes with pinches, nips, bobs, (and other ways which I will not name for the honour I bear them,) so without measure misordered, that I think myself in hell, till time come that I must go to Mr. Aylmer, who teacheth me so pleasantly, so gently, and with such fair allurements to learning, that I think all the time nothing whiles I am with him; and when I am called from him I fall on weeping."



[Portrait of Lady Jane Grey.]

[NOTICE.—PENNY CYCLOPÆDIA.]

The attention of the Committee has been called to several erroneous statements in the article Aberdeen, in this work. The granite bridge there mentioned as being over the Dee is over the Don-burn; there are six kirks instead of two; and the poors' hospital has been long since removed from behind the town-house. The Committee regret these misstatements; and, as no information is more difficult to obtain with correctness than topographical, owing to the changes that are constantly going forward, especially in commercial places, they are making arrangements for procuring the revision of such articles by local residents in all important British towns. In the mean time they beg to invite communications from their readers, should such errors again arise; and with reference to this particular case, as well as others, it is their intention, upon the completion of each volume, to publish a List of Corrections with the Title; which will be delivered gratis.

. The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

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DOVER CASTLE.



[Dover Castle, from the Beach under Shakspeare's Cliff.]

At the south-eastern corner of England, upon the summit of a chalk cliff from 350 to 400 feet in height, and at the distance of about twenty-one miles from the opposite coast of France, stands Dover Castle. The town of Dover has been built to the west of, and immediately below it. The antiquity of the castle very far exceeds that of the town; and all that the latter contains worthy of remark is of modern date. It is, however, generally known as the key to the Continent, and as possessing a very complete artificial harbour. The coasts of Sussex and Kent, as well as the opposite coast of France, are without natural harbours; but as a proof how far art has supplied this want, the harbours of Dover and Ramsgate, among others, may be referred to with just pride.

The fortifications of the castle are of different epochs, Roman, Saxon, Norman, and of later date. The watch-tower (an octagonal building), the parapet, the peculiar form of the ditch, all exhibit the hand of the Roman architect; and there is no doubt that the Romans had here one of their stationary posts, or walled encampments. The foundations of the watch-tower are laid in a bed of clay, which was a usual practice with the Roman masons; and it is built with a stalactical composition instead of stone, intermixed with courses of Roman tiles. The watch-tower and the ancient church are the only remaining buildings within the Roman fortress. What the precise origin of this church was is not known, but it was consecrated to Christian worship by St. Augustine when he was in England in the sixth century.

The Saxons extended the groundwork of the Roman fortress, and erected a fortress differing materially from that of the Romans, as it consisted merely of perpendicular sides without parapets, surrounded by deep ditches. In the centre of the old Saxon works is the keep, which is, however, of Roman origin, the foundation having been laid in 1153. It is a massy square edifice, the side on the south-west being 103 feet; that on the north-west 108 feet; and the other two 123 feet each. The north turret of the keep is 95 feet above the ground, which is 373 feet above the level of the sea. The view from it, in a clear day, comprises the North Foreland, Ramsgate pier, the Isle of Thanet, the valley of Dover, and the towns of Calais and Boulogne, with the intermediate French coast. The rest of the fortifications are, for the most part, of Roman origin, but present the altered and improved appearance which has been given them by a succession of repairs for a course of centuries.

During the French Revolution it was considered important to secure and defend Dover Castle as a military station. Fifty thousand pounds were voted for this purpose; and miners and other labourers were employed to excavate the rock for purposes of defence, and to cast up additional mounds and ramparts. Extensive barracks were excavated in the solid rock, by which accommodations were provided for a garrison of three or four thousand men. The subterraneous rooms and passages are shown to visitors, upon an order of the military commandant being obtained. There is an armoury in the keep; and many ancient curiosities are to be seen here, among which is Queen Elizabeth's pocket-pistol, a beau-

tiful piece of brass ordnance presented to Elizabeth by the States of Holland, as a token of respect for the assistance she afforded them against Spain. It is twenty-four feet long, and bears a Dutch inscription, of which the following is a translation:—

" O'er hill and dale I throw my ball;
Breaker, my name, of mound and wall."

In Lyon's History of Dover, in two volumes quarto, or in a smaller work published by William Batcheller at Dover, may be found the detailed history of this castle, one remarkable event in which is, that on the 21st of August, 1625, it was surprised and wrested from the King's garrison by a merchant of Dover, named Blake, with only ten of his townsmen, who kept possession of it for the Parliament, and effectually resisted the King's troops. It is also worth notice, that on the 7th of January, 1785, Dr. Jefferies and M. Blanchard embarked in a balloon from the castle heights, and having crossed the channel in safety, descended in the forest of Guisnes in France.

The Lord Warden of the Cinque Ports is Constable of Dover Castle, and has the execution of the King's writs within the Cinque Ports—a jurisdiction extending from Margate to Seaford, independently of the sheriffs of Kent and Sussex. The castle contains a prison used for debtors and smugglers; and the keeper has the feudal designation of Bodar, under the Lord Warden. The courts of Chancery, Admiralty, &c., for the Cinque Ports, are held by the Lord Warden in St. James's church, at the foot of the castle-hill. The office of Lord Warden has been usually given to the first Lord of the Treasury, and is now held by the Duke of Wellington in consequence of his grace having been such first Lord when the office became vacant.

To the west of Dover, opposite the castle, is the celebrated Shakspeare cliff, described in the tragedy of King Lear. It is 350 feet high, and almost perpendicular. The late Sir Walter Scott, when at Dover a few years since on his road to Paris, said to a gentleman who was speaking to him of this cliff: " Shakspeare was a lowland man, and I am a highland man; it is therefore natural that he should make much more of this chalk cliff than I can do, who live among the black mountains of Scotland." The fact is that the cliff is remarkable for its form, but is by no means so awful or majestic as might be supposed, after reading King Lear.

MINERAL KINGDOM.—Section 3.

The means by which geologists have been enabled to fix the order of superposition in the strata composing the crust of the globe have been, partly by the mineral composition of each member of the series, partly by their containing fragments of other rocks, but chiefly from the remains of animals and plants that are imbedded in them. It was observed that there was a class of rocks distinguished by a considerable degree of hardness, by closeness of texture, by their arrangement in slaty beds, and by possessing, when in thick masses, a glistening structure called crystalline by mineralogists, and of which statuary marble or loaf sugar may be quoted as familiar examples: when associated with rocks of another sort, also, they always were lowest.—These are marked R in the diagram, No. 1. Above and in contact with them another group of strata was observed, which had a good deal of resemblance to those below them in mineral composition, but contained rounded fragments of other rocks, and when these fragments were examined they were found to be identical with the rocks composing the lower strata. This second series was observed to be covered by another group of strata which contained shells and corals, bodies that had never been seen in any of the lower strata. Thus it was clear, as the including substance must necessarily be formed subsequently to the pebble or shell it contains, that previous to the formation of this third group there had existed rocks to supply the imbedded fragments, and to contain the waters of the ocean in which the animals that once inhabited the shells must have lived. Ascending still higher, that is, observing the strata as they lay one above another towards the surface, it was found that many were entirely composed of the fragments of pre-existing rocks either in the form of pebbles or of sand cemented together; that there was a vast increase in the number and variety of the imbedded shells, the latter forming very often entire beds of rock many feet in thickness; and that the remains of plants began to appear. In this manner certain great divisions of the strata were established, by very clear and infallible distinctive characters. But it was reserved for an English practical mineral surveyor to make a discovery which gave a new direction to geological inquiries, and which, in the course of a few years, introduced into the science a degree of precision and certainty that was formerly unknown. About thirty-five years ago, Mr. William Smith, of Churchill in Oxfordshire, by an extensive series of observations in different parts of England, ascertained that particular strata were characterized by the presence of certain fossil or petrified shells, which were either confined exclusively to them or in predominating quantity, or were of rare occurrence in other strata; and he was thus enabled to identify two rocks at distant points as belonging to one stratum, when mere mineral characters would either have left him in uncertainty or have entirely failed in deciding the question. When this discovery became known to geologists, numerous observations were made in other countries, which completely proved that the principle was not only applicable in those places which Mr. Smith had had an opportunity of observing, but that it held good generally, and throughout the whole series of strata from the lowest in which organic remains are found to those nearest the surface. Under the direction of this guide, geologists have been enabled to discover lines of separation in the great divisions which, as already mentioned, had been established by prior observations, pointing out distinct epochs of deposition, and revealing a succession of changes in the organic and inorganic creation, in a determinate chronological order. This more accurate knowledge of the structure of the crust of the globe is of the highest interest and importance; not only as a matter of speculative science, but as regards the practical advantages in common life that have been derived from it. Some of the more remarkable results we shall presently advert to; but we must proceed, in the first instance, to describe other parts of that structure.

An examination of the phenomena exhibited by the internal structure of this series of superimposed rocks has established this farther principle—that all the strata must have been deposited on a level foundation,—that is, on pre-existing ground that was either horizontal or nearly so, at the bottom of a fluid holding their materials either in suspension or in solution, or partly both. Now as we know of no fluid in which this could have taken place except water, geologists have come to the conclusion that the chief part of all the strata, however elevated they may now be above the level of the sea, were gradually deposited at the bottom of the ocean, and the remainder of them at the bottom of inland seas or lakes. But if this be so, what mighty revolutions must have taken place to cause rocks formed in the depths of the ocean to occupy the summits of the highest mountains! By what known agency can so extraordinary a change of position have been effected! That the fact of elevation is indisputable, is proved by the shells imbedded in stratified rocks at the greatest elevations; and geologists who have endeavoured to discover by what cause this change in the relative position of the rock and the sea has been brought

about, by an attentive observation of the phenomena of earthquakes and volcanoes, and the resemblance between the products of the latter and certain parts of the earth's structure which we have yet to notice, have arrived at a very probable solution of the problem.

Although the strata were originally deposited in a horizontal position, and are often found so in the greater proportion of cases, especially as regards the inferior members of the series represented in diagram No. 1, Section 2, they are not uniformly so, but are inclined more or less, and they have been seen not only at every angle of inclination, but very often in a vertical position. When a vertical section of a mountain is exposed, as is often the case in valleys or the deep bed of a river, such an appearance as that represented in diagram No. 2, is not uncommon; and if the stratum *a* be composed


(*a*) (*b*) [No. 2.]

of rounded blocks of stone surrounded by fine sand or clay, and if the stratum *b* contain a layer of shells lying parallel to the sides of the stratum, and if they be unbroken although of the most delicate texture, it is manifest that these strata could not have been deposited in their present vertical position, but upon a level ground. Sometimes they are not only disturbed from their horizontality, but are bent and contorted in the most extraordinary way, as if they had been acted upon by some powerful force while they were yet in a soft flexible state, as shown in the diagram No. 3,—an ap-


[No. 3.]

pearance very common in the slate rocks of the north coast of Devon. This seeming disorder and confusion is evidently a part of the order and harmony of the universe, a proof of design in the structure of the globe, and one of the progressive steps by which the earth seems to have been prepared as a fit habitation for man. For if all the strata had remained horizontal, that is, parallel to the surface of the globe, if they had enveloped it like a shell, or, to use a familiar example, had they surrounded it like the coats of an onion, it is clear that we should never have become acquainted with any other than the upper members of the series, and that the beds of coal and salt, and the ores of the metals, all of which are confined to the inferior strata, could never have been made available for the purposes of man. Without this elevation of the strata the earth would have presented a monotonous plain, unbroken by the beautiful forms of hill and valley or the majestic scenery of mountains. With these inequalities of the surface are intimately connected all the varieties of climates, and the diversified products of animal and vegetable life dependent thereon; as well as the whole of what may be termed the aqueous machinery of the land, the fertilizing and refreshing rains, the sources of springs, inland lakes, and the courses of rivers and brooks in their endless ramifications. Throughout all this there reigns such a harmony of purpose, that the conclusion is irresistible, that the breaking up of the earth's crust is not an irregular disturbance, but a work of design, in perfect accordance with the whole economy of nature.

We have said that if we dig through the superficial covering of sand and clay we usually come upon stone disposed in layers; but there are many places where we should find a rock without any such arrangement, and which would continue of the same uniform texture, and without any parallel rents dividing it into beds, however deeply we might penetrate into it. Such *unstratified rocks*, although of limited extent in proportion to the *stratified rocks*, constitute a considerable portion of the crust of the earth, and in all parts of it they generally rise above the surface in huge unshapen masses, surrounded by the stratified rocks; and sometimes they occupy districts of great extent where none of the latter rocks can be seen. In mineral composition they are essentially different from the other class; never consisting of limestone, or sandstone, or clay, and never containing rounded pebbles, shells, or the remains of any other kind of organized matter. Their elementary constituent parts are simple mineral substances, which, although sometimes found in the stratified rocks, are always in the rocks we now speak of, in different combinations: they are always in that particular state called crystalline; and when the parts are large enough to be distinguished they are seen to interlace each other, and by this arrangement they form a very hard tough stone, very difficult to break into regular squared forms or to work with the chisel, and they are capable of receiving very often a high polish. The substances most familiar to us in common life which belong to this class of rocks, are granite, whinstone, and basalt. The stones in the carriage-ways, and the curb-stones of the side-pavement, in the streets of London are usually granite; Waterloo Bridge is built of it; and fine specimens of different varieties may be seen in the new buildings in Covent Garden Market, in the King's Library at the British Museum, and among the larger Egyptian antiquities at the latter place. Granite is found in great abundance in the Grampians and other mountains of Scotland, in Devonshire in the mountainous district of Dartmoor, and in several parts of Cornwall. There are various kinds of *whinstone*, which is a term chiefly used in Scotland and the north of England, although the rock is met with in Wales and in the centre and western parts of England. The varieties, however, are usually produced by changes in the proportions and sizes of the same ingredients. It is usually of a dark green colour approaching to black, and often speckled with white. Some of the paving-stones of the carriage-ways in the streets of London are whinstone, brought from the neighbourhood of Edinburgh. It is often met with in the form of natural pillars, not round but angular, having sometimes three, sometimes six, and even eight sides, which are usually called *basaltic columns*: the Giant's Causeway in Ireland, and Fingal's Cave in the island of Staffa, on the west coast of Scotland, are beautiful examples of that peculiar structure.

In our next section we shall proceed to show that these unstratified rocks have acted a very conspicuous part in the various changes which the crust of the earth has undergone.

GUSTAVUS THE GREAT OF SWEDEN.

The following account is from materials given in the Travels of Schubert, a German, in Sweden and Norway. It relates to some of the personal adventures of Gustavus Erickson Vasa, a Swede of noble family; whom Christian II. of Denmark, then the oppressor of Sweden, had carried off to Denmark, contrary to his word. Gustavus soon made his escape to Sweden, and this was the commencement of a revolution for his native country.

About a quarter of a mile (German) beyond Dalsjö, a short distance from the road and to the right, on a point of land projecting into the great lake Runn, stands the building which is noted for having been the residence of

Gustavus I. in 1520. A beautiful walk leads to it, and delightful valleys covered with shrubs lie all around the lake. The wooden house in which Gustavus was concealed when the owner Arendt Pehrsson Ornflyckt betrayed him, and the traitor's wife, Barbara Stigsdotter, saved him, is still maintained in the same condition that it was in the time of Gustavus, and has lately had a new roof. The crown allows a fixed sum to the proprietor for the maintenance of this house, which shows the simplicity of its former inhabitants. Like the farm-houses of Switzerland, it is surrounded by a covered balcony which is ascended by a flight of steps: this balcony forms the entrance to the house. In the wardrobe, where Gustavus was concealed, which is a room with very small windows, there is a wooden statue of Gustavus in his royal robes, resting on the Bible, which he caused to be translated and published at Upsal, in 1541. In one hand he holds a telescope. On the table on which the Bible lies we see his gloves, which are iron on the outside and leather on the inside, his iron gorget and helmet; and on the mantel of the window his brass watch. On the walls are suspended his coat of mail made of brass wire, his dagger, and his cross-bow, with the pedigree of the family of Gustavus, the portraits of the Swedish kings of this family, and a map of Dalarne (Dalecarlia). Over the entrance are some verses which remind the visitor with what feelings he ought to approach this national sanctuary; and near it three standing figures, one the body servant of Gustavus with arrow and lance, and the two others Dalecarlian peasants armed with cross-bow and quiver, in a white dress and peaked hats, which are now no longer in fashion. Some simple verses over these figures relate their patriotic deeds. Other verses tell, in chronological order, the most remarkable events in the life of Gustavus; they say how Gustavus fled in 1520 to Dalecarlia, and how Pehrsson and his wife kindly received him. But Pehrsson soon went to his brother-in-law, who held an office under King Christian, to concert with him about making Gustavus prisoner. His honest wife, however, saved the fugitive: she let him down from the window by some towels, and Jacob (one of the Dalecarlian peasants just alluded to) took him with all possible speed over lake Runn to the house of Pastor John. Though John had been a friend of Gustavus at the university, he did not make himself known till he had worked at threshing corn with the servants for some time, and had found out by inquiry John's feelings towards *Gustavus Erickson*. After this he only stayed three days with John, being closely pursued by his enemies; and he fled to the house of Sven Elfsson, an honest farmer, where he stayed till spring. But even in this obscure retreat his enemies followed him, and once actually entered the room where Gustavus was standing and warming himself at the fire. Sven's wife, who was baking bread, observing that the eyes of the Danes were steadily directed on the strange young man, immediately struck Gustavus with her bread-shovel, exclaiming, in angry tone, "Why stand you here gaping on the strangers? did you never see a man before? off to the barn!"—Gustavus went off to his threshing. From this hospitable retreat Sven took him in a waggon filled with straw, under which he was hid, to Marnas, over bridges and through passes occupied by the Danes, who stuck their daggers and pikes into the waggon, and wounded Gustavus. But the pain could not make him utter a single syllable; and he was saved by his own fortitude, added to the dexterity of the driver, who wounded the horse, and thus led the Danes to believe that the blood on the ground came from the animal. From Marnas, Gustavus was secretly conveyed to a forest on the river Luugsjo, where a decaying pine-tree afforded him shelter for three days. He was supplied with food from Marnas. As soon as it could be effected without danger, his two friends at Marnas, named Olson, took him to Gardsjo, where he stayed for some time concealed in a cellar near the church. Here, at last, he showed himself, and, in an inspiriting address, urged the people to war. The Danes appeared, but the peasants sounded the alarum-bell, and the Danes with difficulty made their escape.

After a short time the war commenced, which ended in seating Gustavus on the throne of Sweden.

GLOBE THEATRE.



[Globe Theatre, Bankside.]

The above wood-cut exhibits the Globe Theatre, previous to its conflagration in 1613; it is taken from the 'View of London as it appeared in 1599.' The Globe, which was converted from a bear-garden into a theatre about the year 1590, stood nearly opposite the end of Queen-street, Cheapside, and was a hexagonal building of wood, partly open at the top, partly thatched with reeds. The performances took place by day-light, and during the time of playing a flag was displayed on the roof. About 1596, the proprietors, of whom Shakspeare became subsequently one, had the old edifice pulled down, and a more commodious theatre erected.

On the 29th June, 1613, the new house was entirely destroyed by fire. The performers were representing Shakspeare's play of Henry VIII., and on the King's entrance in the masquerade some cannon were discharged, the wadding from which set fire to the thatch. In the following year it was rebuilt with more splendour than it before could boast of, and is mentioned by Taylor the poet, in the following lines:—

> "As gold is better that's in fire tried,
> So is the Bankside Globe that late was burned,
> For where before it had a thatched hide
> Now to a stately theatre is turned:
> Which is an emblem that great things are won
> By those who dare through greatest dangers run."

Performances were probably continued at this theatre till the year 1642, when the Parliament issued an order for suppressing all theatrical representations. Its site is now occupied by Barclay and Perkins's brewery, formerly the property of Mr. Thrale.

Singular Rocks.—A rock near the island of Corfu bore, and still bears, the resemblance of a vessel under sail: the ancients adapted the story to the phenomenon, and recognised in it the Phœnician ship in which Ulysses returned to his country, converted into stone by Neptune for having carried the slayer of his son Polyphemus. A more extensive acquaintance with the ocean has shown that this appearance is not unique: a similar one on the coast of Patagonia has more than once deceived both French and English navigators; and Captain Hardy, in his Travels in Mexico, has recorded another near the shores of California.—*Foreign Review.*

THE BAMBOO.



The bamboo is a native of the hottest regions of Asia. It is likewise to be found in America, but not in that abundance with which it flourishes in the old world. It is never brought into this country in sufficient supply for any useful purposes, being rather an object of curiosity than of utility. But in the countries of its production it is one of the most universally useful plants. "There are about fifty varieties," says Mr. Loudon, in his Botanical Dictionary, "of the *Arundo bambos*, each of the most rapid growth, rising from fifty to eighty feet the first year, and the second perfecting its timber in hardness and elasticity. It grows in stools which are cut every two years. The quantity of timber furnished by an acre of bamboos is immense. Its uses are almost without end. In building it forms almost entire houses for the lower orders, and enters both into the construction and furniture of those of the higher class. Bridges, boats, masts, rigging, agricultural and other implements and machinery; carts, baskets, ropes, nets, sail-cloth, cups, pitchers, troughs, pipes for conveying water, pumps, fences for gardens and fields, &c. are made of it. Macerated in water it forms paper; the leaves are generally put round the tea sent to Europe: the thick inspissated juice is a favourite medicine. It is said to be indestructible by fire, to resist acids, and, by fusion with alkali, to form a transparent permanent glass."

WANDERING ITALIANS.—No. 2.

The emigrants from the North of Italy are far more numerous, and generally engaged in more respectable or more important pursuits, than the poor peasants of the Apennines, of whom we gave an account in a preceding number. These Northern Italians come principally, as we have mentioned, from the lakes of Upper Italy, and the valleys and declivities of the Alps. The same curious practice obtains here as in the Apennines, and on a larger scale—that is, each district embraces a particular calling, and never interferes with that of its neighbours. For generation after generation, one place has sent forth venders of barometers, &c.; another place, innkeepers and servants for inns; another, stone-cutters; another, house-painters and white-washers; another, masons and architects, and so on. We will begin with those from the lake of Como, the class of emigrants most frequently found in England, and, perhaps, the most intellectual and important of the whole.

The large and beautiful lake of Como is principally fed by the waters and melting snow of the neighbouring Alps, and is almost entirely surrounded by lofty and very steep mountains that are picturesque to the eye rather than productive to the poor inhabitants. In their best parts, the superior region of these mountains offers woods and pastures, the middle region an abundance of chesnut trees, and the lower declivities bear vines, mulberry trees, a few olives, and vegetables. Corn is grown in some places, and rye in others; but frequently under circumstances of great difficulty, requiring infinite labour and ingenuity. The bear, the wolf, the chamois, the white hare, the marmot, and other wild animals are found on these mountains; whose sides, like those of the Apennines, are frequently swept by tremendous hurricanes, which throw down the walls built to retain the soil, carry away the earth and its produce, and destroy the labours of years. Hard, however, as is the struggle of man with nature, population has gone on increasing in these parts, and the number of towns and villages is very considerable. Many of these, as seen from the level of the lake, present the most striking and picturesque appearances imaginable. The inhabitants of these places have devoted themselves principally to the manufacture of barometers, thermometers, and other useful instruments, which have at different periods originated in philosophical discoveries and improvements in the knowledge of physics. These simple mountaineers have shown a remarkable degree of intelligence in these matters, and an aptitude to comprehend and imitate machines and instruments used in the natural sciences, as soon as they have been invented. With this branch of industry they not merely emigrate to all parts of Italy, but to France, England, Germany, Russia—to every part of Europe—whilst some have even crossed the Atlantic both to North and South America. Like the manufacturers of plaster figures from Lucca, these barometer-makers from the lake of Como can find the simple materials employed in the construction of their wares in most of the towns or great cities whither they may go. Generally, however, of late years, in England and the more civilized portions of Europe, they have opened shops in places where they have settled for longer or shorter periods. But the number of those who have relinquished their own country, and made a permanent settlement in England and elsewhere, is remarkably small. The attachment to their mountain homes is as strong in the breasts of the wanderers from Como as we have described it in the poor peasants from the Apennines, and their scope and ambition are the same—to return to the scenes of their birth, to become the owners of a little estate, and to build a house of their own. We must remind the reader (a circumstance, however, that will probably strike him from what has been said), that as the speculations of the Comaschi (people of Como) are more important than those of the leaders of bears, and showers of monkeys and white mice, much more money is carried back to the mountains round the lake of Como than to the Apennines. The effect of this is seen in the superiority in the style and condition of their houses, gardens, and lands. The major part of the capital thus obtained by foreign trade is invested in agriculture and in rendering productive the naturally rude or difficult uneven soil they inhabit. Their grounds could be preserved and made fruitful only by excessive care; their gardens are cultivated with much neatness, and the luxuriant vine is made to climb over the snow-white walls of their pleasant homes, or is suspended over trellices to form a verdant avenue to their doors. The general practice with those who have made their little fortunes abroad, is to leave their sons, or to invite from Italy some near relative or family connexion, to come and take possession of their

shop and trade; and when this is done, and the new occupants sufficiently instructed how to proceed, the retiring tradesmen take their way back to Como. It is the custom for those who are not at very remote distances from their native country to return home once in two years, and pass the winter with their friends.

It is asserted on good authority that in these emigrating districts, except during the winter, it used to be a common thing to find not more than a tenth part of the male population at home. The women, who are strong and laborious, did the labour of the men in their absence, cultivated the farms, which are not extensive, and with the children tended their herds of goats and their few sheep. After the first French revolution the tide of emigration had somewhat decreased; but since peace has been established on the Continent, and communications re-opened with England, it has gone on increasing. Though not subjected to the miserable privations of the Apennine emigrants, the Comaschi, almost universally, live very soberly, and persevere in a plan of strict economy while abroad. A few years ago there used to be a public-house somewhere in Holborn, frequented on the Saturday night by the men from the lake of Como; and another, near Oxford Street, resorted to by the plaster-figure makers from Lucca. The writer of this article, who had lately returned from Italy, had once the curiosity to go into both these places of rendezvous. He found each party very gay—talking a great deal, but drinking very little; and he was struck, as he had often been before, by their continually-recurring recollections of home, and by the pure Italian spoken by the Lucchesi, and the almost unintelligible jargon of the Comaschi. Before quitting this part of our subject, we may remark that as the wandering Lucchesi, with their cheap plaster casts, have propagated a taste for the fine arts, so have the emigrant Comaschi served to familiarize even the poor and lowly with the discoveries of physics and useful inventions. Penetrating into one country after another, as they have long been doing, they may be considered as retailers and propagators of science. On the other hand, returning home, they have distributed the manufactures of foreign countries through their native mountains; for every time that a Comasco returns to his village, whether it be for good or only for a short visit to see his family and friends, he carries with him a little *paccotiglia* or adventure of wares from the lands in which he has sojourned. In this way our Sheffield and Birmingham manufacturers have been indebted to them; for no articles are more acceptable than English razors, scissors, pocket-knives, &c., and these the Comaschi carry back to their countrymen in considerable quantities. Thus these humble persons in more ways than one advance the civilisation of the world.

The next class of northern Italian emigrants we shall notice are those from the Val d'Intelvi—a secluded mountain valley, about eight miles in length, situated between the lake of Como and the neighbouring lake of Lugano. The inhabitants of this district are nearly all builders and masons, architects, and civil engineers. To exercise their professions they regularly emigrate, not merely to all parts of Lombardy and of the Venetian States, but to nearly every state and province in Italy, from the Alps as far the Neapolitan kingdom. Indeed a building of any importance is seldom found in progress in any part of the Peninsula, without a number of these industrious and ingenious emigrants being employed about it. Some of them go into Switzerland, and others seek employment in Germany. They love their homes as much as their neighbours; and, though often prevented by distance and other circumstances arising from their profession, their general object is to return to the Val d'Intelvi every winter. Many of these mountaineers are men of considerable scientific acquirements and excellent practical mathematicians. The Italian portion of the grand road of Mount Simplon, which, of the two, is better made than the French portion, though the difficulties to be overcome on the Italian side were incomparably greater than those on the French, was mainly executed under the superintendence of engineers from the Val d'Intelvi, the lake of Como, &c. Indeed these Italian mountaineers—"*gente nata in aria fina*" (people born in a subtle atmosphere), as their countrymen say of them, are justly celebrated in all Upper Italy for their perspicacity, perseverance, sagacity, and sound judgment; and from them proceed not only the best engineers, but the most distinguished lawyers.

Leaving the lakes of Como and Lugano for the lake Maggiore, we find on the shores of the latter lake another emigrating district. This is towards the head of the Lago Maggiore, near to Locarno, where the inhabitants are chiefly house and ornamental painters or decorators. Leaving also the Lago Maggiore and approaching the Alps, not far from Domo d'Ossola, and immediately at the foot of Mount Simplon, there is another and numerous class of emigrants, who are also house-painters and white-washers, called by the Lombards and Piedmontese "*Sbianchini.*" These humble artists go to many parts of Italy and to Switzerland. They invariably leave their homes in spring and return at the approach of winter.

Another class of emigrants, the next in consequence, and perhaps superior in wealth to the Comaschi, come from the beautiful little lake of Orta, near the other end of the Lago Maggiore. These all leave home as hotel servants or keepers of little inns, from which humble condition the clever or the successful gradually raise themselves to the rank of keepers of hotels and to the acquisition of fortune. They settle in different parts of Lombardy and the rest of Upper Italy. They go to Germany, to Spain (in considerable numbers), and some of them come to England. Pagliano, the hotel keeper in Leicester Square, though himself from Piedmont, has generally some servants from this district, who contrive even in England to live upon almost nothing, and to save nearly all their wages and other gains. To the knowledge of the writer of this article, a few years ago, the "Fontana de Oro," and one or two more of the best hotels at Madrid, an hotel at Seville, one at Cadiz, and another and a very good one at Algesiras opposite Gibraltar, were kept by individuals from the Lago d'Orta and its neighbourhood. Averse to perpetual expatriation, and fond of their native spots as the rest of their countrymen, these people are continually returning home as soon as they have made a fortune, and these fortunes are in many cases very considerable. Here, therefore, as at Como, neat houses and elegant little villas are seen, added from time to time, on the shores and hills above the tranquil lake. The villages are numerous, well-peopled, and prosperous; a cheerful and social spirit prevails; and the retired *osti* or innkeepers, retaining their old habits, and being fond of crowded companies, nothing is more common than to find fifty or sixty individuals assembled in the evening at one house, playing at *tarrocco* and other games of cards, and enjoying festivity and music. Their season of greatest hilarity is the autumn—the time the Italians prefer for their *villeggiatura* or residence in the country; and at this season the lake of Orta has long been, like the famed abbey of Vallombrosa in the words of Ariosto,—

> "Ricca e bella, non men religiosa,
> E cortese a chiunque vi venia."
> Beauteous and rich, and not the less devout
> And courteous to every comer there.

Their courtesy and hospitality are indeed at the autumnal season remarkable, and extended to all visitors whether friends or strangers. It is pleasant to see these people in the evening of life enjoying what they have so hardly earned and struggled for. The whole secret of all these emigrants retiring with independence, while

the natives of the countries where they have been who exercised the same callings merely contrive to live, is to be found in their frugal, abstemious, and regular habits—in their faculty of sacrificing the present to the future—and in their laudable ambition of becoming the owners of a house and a piece of land in their own country—a prospect that is hardly ever from before their eyes.

There are a few other emigrant districts besides these described. A certain number of peasants emigrate from the Val d'Aosta, on the Piedmontese side of the Alps, exercising the same callings as the wanderers from the Apennines and the Savoyards, with whom they are often confounded. From the Italian portion of the Tyrol, also, some troops wander about every year selling their manufactures, which are *tappeti* or coverings for tables, but they seldom cross the Alps. The desire for travel is a great passion amongst the people whom we have noticed. The mountaineers of all that part of Italy which touches on, or is part of, the Alps, generally love a wandering life and are averse to service, though when they take to it they are excellent and most trustworthy domestics. The honesty, the orderly conduct, and civility (in its extended sense) of the Comaschi in particular are proverbial. These qualities strike the traveller or casual observer; but we have it from a gentleman who has not only been long resident on the lake of Como, but once employed in the Council of State of Milan, that for year after year there used to be scarcely an instance of a crime committed in those districts; and that the office of Judge seemed to be a sinecure among them.

GALILEO.

The 19th of February by some accounts, but according to the best authorities the 15th, is the anniversary of the birth of one of the greatest philosophers of modern times, the celebrated Galileo Galilei. He was born at Pisa, in 1564. His family, which, till the middle of the 14th century, had borne the name of Bonajuti, was ancient and noble, but not wealthy; and his father, Vincenzo Galilei, appears to have been a person of very superior talents and accomplishments. He is the author of several treatises upon music, which show him to have been master both of the practice and theory of that art. Galileo was the eldest of a family of six children, three sons and three daughters. His boyhood, like that of Newton, and of many other distinguished cultivators of mathematical and physical science, evinced the natural bent of his genius by various mechanical contrivances which he produced; and he also showed a strong predilection and decided talent both for music and painting. It was resolved, however, that he should be educated for the medical profession; and with that view he was, in 1581, entered at the university of his native town. He appears to have applied himself, for some time, to the study of medicine. We have an interesting evidence of the degree in which his mind was divided between this new pursuit and its original turn for mechanical observation and invention, in the history of his first great discovery, that of the isochronism (or equal-timedness, as it might be translated,) of the vibrations of the pendulum. The suspicion of this curious and most important fact was first suggested to Galileo while he was attending college, by the motions of a lamp swinging from the roof of the cathedral. It immediately occurred to him that here was an excellent means of ascertaining the rate of the pulse; and, accordingly, after he had verified the matter by experiment, this was the first, and for a long time the only, application which he made of his discovery. He contrived several little instruments for counting the pulse by the vibrations of a pendulum, which soon came into general use, under the name of *Pulsilogies;* and it was not till after many years that it was employed as a general measure of time. It was probably after this discovery that Galileo began the study of mathematics. From that instant he seemed to have found his true field. So fascinated was he with the beautiful truths of geometry, that his medical books henceforth remained unopened, or were only spread out over his Euclid to hide it from his father, who was at first so much grieved by his son's absorption in his new study, that he positively prohibited him from any longer indulging in it. After some time, however, seeing that his injunctions were insufficient to overcome the strong bias of nature, he yielded the point, and Galileo was permitted to take his own way. Having mastered Euclid, he now proceeded to read the Hydrostatics of Archimedes; after studying which he produced his first mathematical work, an Essay on the Hydrostatical Balance. His reputation soon spread itself abroad; and he was introduced to one of the ablest of the Italian mathematicians of that day, Guido Ubaldi, who, struck with his extraordinary knowledge and talents, recommended him to the good offices of his brother, the Cardinal del Monte; and by the latter he was made known to the then Grand Duke Ferdinand. The road to distinction was now open to him. In 1589 he was appointed to the office of Lecturer on Mathematics in the University of Pisa; and this situation he retained till 1592, when he was nominated by the Republic of Venice to be Professor of Mathematics for six years in their University of Padua. From the moment at which he received the first of these appointments, Galileo gave himself up entirely to science; and, although his salary at first was not large, and he was consequently, in order to eke out his income, obliged to devote a great part of his time to private teaching, in addition to that consumed by his public duties, his incessant activity enabled him to accomplish infinitely more than most other men would have been able to overtake in a life of uninterrupted leisure. The whole range of natural philosophy, as then existing, engaged his attention; and besides reading, observation, and experiment, the composition of numerous dissertations on his favourite subjects occupied his laborious days and nights. In 1598 he was re-appointed to his professorship with an increased salary; and in 1606 he was nominated for the third time, with an additional augmentation. By this time he was so popular as a lecturer, and was attended by such throngs of auditors, that it is said he was frequently obliged to adjourn from the largest hall in the university, which held a thousand persons, to the open air. Among the services which he had already rendered to science may be mentioned his contrivance of an instrument for finding proportional lines, similar to Gunter's scale, and his rediscovery of the thermometer, which seems to have been known to some of the ancient philosophers, but had long been entirely forgotten. But the year 1609 was the most momentous in the career of Galileo as an enlarger of the bounds of natural philosophy. It was in this year that he made his grand discovery of the telescope—having been induced to turn his attention to the effect of a combination of magnifying glasses, by a report which was brought to him, while on a visit at Venice, of a wonderful instrument constructed on some such principle, which had just been sent to Italy from Holland. In point of fact, it appears that a rude species of telescope had been previously fabricated in that country; but Galileo, who had never seen this contrivance, was undoubtedly the true and sole inventor of the instrument in that form in which alone it could be applied to any scientific use. The interest excited by this discovery transcended all that has ever been inspired by any of the other wonders of science. After having exhibited his new instrument for a few days, Galileo presented it to the Senate of Venice, who immediately re-elected him to his professorship for life, and doubled his salary, making it now one thousand florins. He then constructed another

telescope for himself, and with that proceeded to examine the heavens. He had not long directed it to this, the field which has ever since been its principal domain, before he was rewarded with a succession of brilliant discoveries. The four satellites, or attendant moons, of Jupiter, revealed themselves for the first time to the human eye. Other stars unseen before met him in every quarter of the heavens to which he turned. Saturn showed his singular encompassing ring. The moon unveiled her seas and her mountains. The sun himself discovered spots of dark lying in the midst of his brightness. All these wonders were announced to the world by Galileo in the successive numbers of a publication which he entitled the '*Nuncius Sidereus*, or Intelligence of the Heavens,' a newspaper undoubtedly unrivalled for extraordinary tidings by any other that has ever appeared. In 1610 he was induced to resign his professorship at Padua, on the invitation of the Grand Duke of Tuscany to accept of the appointment of his first mathematician and philosopher at Pisa. Soon after his removal thither Galileo appears to have for the first time ventured upon openly teaching the Copernican system of the world, of the truth of which he had been many years before convinced. This bold step drew down upon the great philosopher a cruel and disgraceful persecution which terminated only with his life. An outcry was raised by the ignorant bigotry of the time, on the ground that in maintaining the doctrine of the earth's motion round the sun he was contradicting the language of Scripture, where, it was said, the earth was constantly spoken of as at rest. The day is gone by when it would have been necessary to attempt any formal refutation of this absurd notion, founded as it is upon a total misapprehension of what the object of the Scriptures is, which are intended to teach men morality and religion only, not mathematics or astronomy, and which would not have been even intelligible to those to whom they were first addressed, unless their language in regard to this and various other matters had been accommodated to the then universally prevailing opinions. In Galileo's day, however, the Church of Rome had not learned to admit this very obvious consideration. In 1616 Galileo, having gone to Rome on learning the hostility which was gathering against him, was graciously received by the Pope, but was commanded to abstain in future from teaching the doctrines of Copernicus. For some years the matter was allowed to sleep, till in 1632 the philosopher published his celebrated Dialogue on the two Systems of the World, the Ptolemaic and the Copernican, in which he took but little pains to disguise his thorough conviction of the truth of the latter. The rage of his enemies, who had been so long nearly silent, now burst upon him in a terrific storm. The book was consigned to the Inquisition, before which formidable tribunal the author was forthwith summoned to appear. He arrived at Rome on the 14th of February, 1633. We have not space to relate the history of the process. It is doubtful whether or no Galileo was actually put to the torture, but it is certain that on the 21st of June he was found guilty of heresy, and condemned to abjuration and imprisonment. His actual confinement in the dungeons of the Holy Office lasted only a few days; and after some months he was allowed to return to his country seat at Arcetri, near Florence, with a prohibition, however, against quitting that retirement, or even admitting the visits of his friends. Galileo survived this treatment for several years, during which he continued the active pursuit of his philosophical studies, and even sent to the press another important work, his Dialogues on the Laws of Motion. The rigour of his confinement, too, was after some time much relaxed; and although he never again left Arcetri (except once for a few months), he was permitted to enjoy the society of his friends in his own house. But other misfortunes now crowded upon his old age. His health had long been bad, and his fits of illness were now more frequent and painful than ever. In 1639 he was struck with total blindness. A few years before the tie that bound him most strongly to life had been snapt by the death of his favourite daughter. Weighed down by these accumulated sorrows, on the 8th of January, 1642, the old man breathed his last at the advanced age of seventy-eight. For a full account of Galileo—of what he was and what he did—the reader ought to peruse his Life in the 'Library of Useful Knowledge,' from which the above rapid sketch has been abstracted. The subject of the philosopher and his times is there treated in ample detail, and illustrated with many disquisitions of the highest interest.



[Portrait of Galileo.]

Blarney.—In the highest part of Blarney Castle, in the county of Cork, is a stone usually pointed out to the visitor, which is said to have the power of imparting to the person who kisses it the unenviable privilege of hazarding, without a blush, that species of romantic assertion which many term falsehood. Hence the phrase of blarney, applied to such violations of accuracy in narration.—*Brewer's Beauties of Ireland.*

Excess in the Pursuit of Knowledge.—The principal end why we are to get knowledge here is to make use of it for the benefit of ourselves and others in this world; but if by gaining it we destroy our health, we labour for a thing that will be useless in our hands; and if by harassing our bodies (though with a design to render ourselves more useful), we deprive ourselves of the abilities and opportunities of doing that good we might have done with a meaner talent, which God thought sufficient for us, by having denied us the strength to improve it to that pitch, which men of stronger constitutions can attain to, we rob God of so much service, and our neighbour of all that help, which, in a state of health, with moderate knowledge, we might have been able to perform. He that sinks his vessel by overloading it, though it be with gold and silver and precious stones, will give his owner but an ill account of his voyage.—*Locke.*

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

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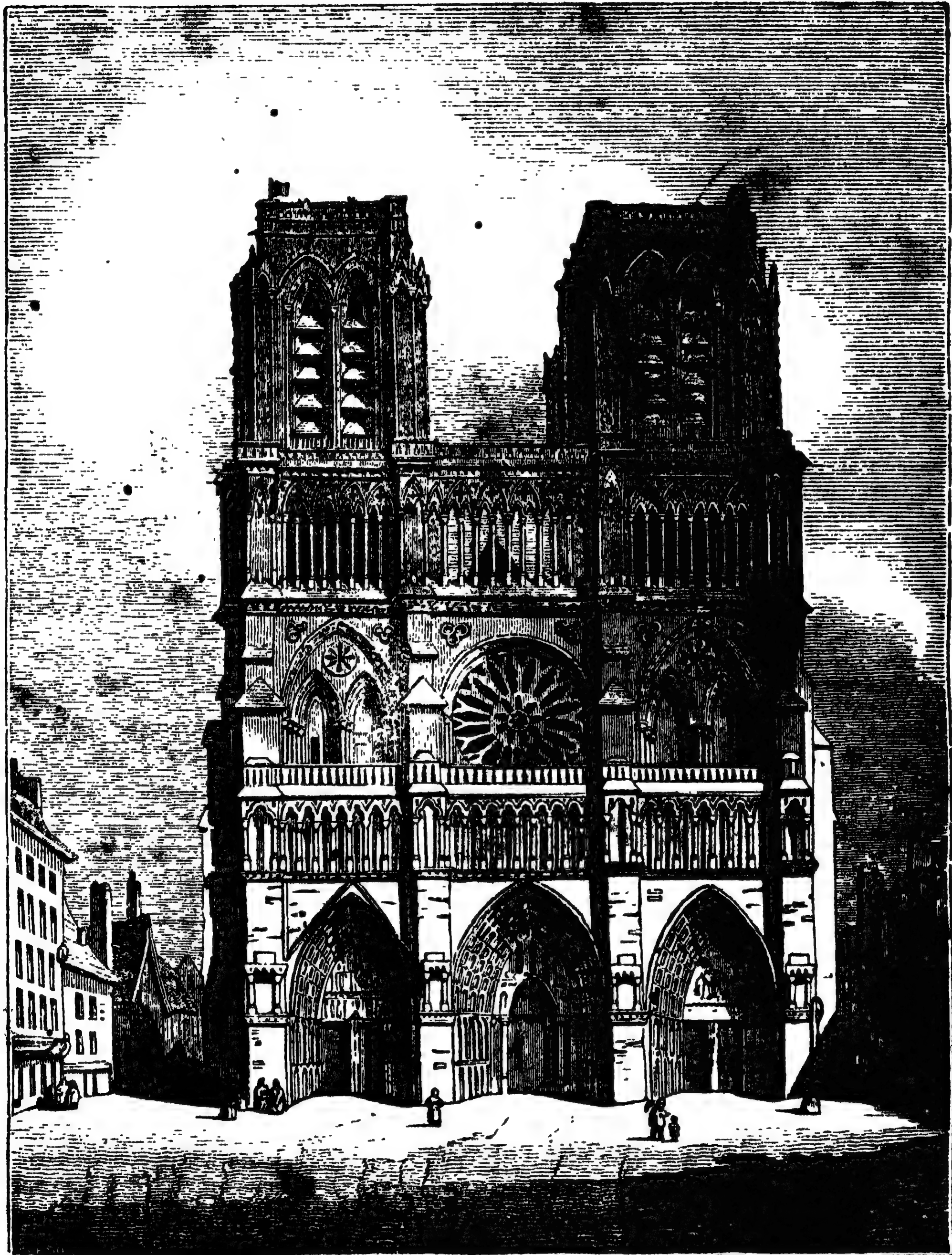
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NOTRE DAME.



[Principal Front of the Cathedral of Nôtre Dame.]

THE cathedral of Nôtre Dame, the mother-church of France, occupies the south-east corner of the small island in the Seine, called the *Isle de la Cité*, or the *Isle du Palais*, and is consequently almost in the centre of Paris. It is a Gothic building, venerable for its antiquity; and also, in its architectural character, not destitute either of grandeur or beauty, although it cannot be ranked upon the whole among the happiest specimens of the style to which it belongs. The site of the church of Nôtre Dame appears to have been devoted to sacred purposes from very early times. In making some excavations under the choir, in March 1711, there were found, at the depth of fifteen feet below the surface, nine stones bearing inscriptions and figures in bas-relief, which seemed to have originally formed an altar dedicated conjointly to Esus, or Eus (the Celtic God of Battle and Slaughter), to Jupiter,

Vulcan, Castor, and Pollux. From the circumstance of ashes and incense being still found in the hole where the fire had been placed, it was inferred that the altar had stood on the same spot where its ruins were discovered. It is probable, however, that it stood in the open air; for there is no reason to believe that any Pagan temple was ever erected within the bounds of this islet. These sacred edifices among the ancient Gauls were for the most part placed outside the towns; and this seems clearly to have been the case with those at Paris. The first Christian church which Paris possessed was erected on or close to the site of the present cathedral. Its date is assigned to about the year 375, in the reign of Valentinian I. This church was dedicated to St. Stephen, and it was for a long time the only one in the city. About the year 522, Childebert I., the son of Clovis, erected another close beside it, which he dedicated to the Virgin. The present cathedral may be considered as uniting these two churches, covering as it does nearly the whole space which they formerly occupied. It was begun to be built, according to some accounts, about the year 1010, in the reign of Robert II. surnamed the Devout, the son and successor of Hugh Capet; while others refer it to the time of Robert's great-great-grandson, Louis VII. or the Young, in the year 1160. It is most probable, however, that it was not really commenced till after the accession of Louis's celebrated son and successor Philip II., usually called Philip Augustus, who occupied the throne from 1180 till 1223. The work was carried on with the extreme deliberation common in those times, in the case of structures which were intended for the utmost possible duration; and it was not quite finished till the close of the reign of Philip VI., or about the middle of the fourteenth century.

The principal front of the cathedral of Nôtre Dame is the west. It consists of three portals, surmounted by a pillared gallery, over which again are a great central and two side windows, from which the principal light for the body of the church is derived. Over the windows is another gallery supported by columns; from the extremities of which rise two towers, 204 feet in height, but more remarkable for solidity than elegance. The architecture of this front is altogether of a very florid description, and presents many grotesque ornaments. Originally a flight of thirteen steps used to lead up to the doors; but such has been the accumulation of the surrounding soil, that it is now considerably higher than the floor of the church. The gallery immediately over the doors used formerly to contain twenty-eight statues of the kings of France, from Childebert to Philip Augustus inclusive; but these were pulled down and destroyed in the early fury of the Revolution. The cathedral, indeed, sustained many other injuries besides this in the confusion of those times. Of its most ancient and curious ornaments, the greater number were carried away; nor have all the efforts that have since been made, both by Bonaparte and the Bourbons, effected its restoration to its former splendour.

The walls of the cathedral of Nôtre Dame are remarkably thick. The dimensions of the interior are, 414 feet in length by 144 in width. The roof is 102 feet high. The columns from which the arches spring by which the roof and galleries are sustained amount in all to nearly three hundred, and each is formed of a single block of stone. Of forty-eight chapels, which it originally possessed, thirty still remain. The choir, and especially the altar and the sanctuary in which it is placed, are decorated in a style of extraordinary richness; and many paintings by eminent French artists, some of which are of considerable merit, ornament various parts of the church. The regalia of Charlemagne are still preserved here. The nave or body of the cathedral is singularly gloomy; and a considerable part of its imposing effect is probably derived from that circumstance. The view from the summit of the towers is one of the most commanding in Paris, and embraces the whole city and its surrounding villages.

THE ORPHANS.

I was staying, about ten years since, at a delightful little watering-place on the southern coast, which, like many other pretty objects, is now ruined by having had its beauty praised and decorated. Our party had wandered, one sunny afternoon, to an inland village. There was amongst us all the joyousness of young hearts; and we laughed and sang, under an unclouded sky, "as if the world would never grow old." The evening surprised us at our merriment; and the night suddenly came on, cloudily, and foreboding a distant storm. We mistook our way, and, after an hour's wandering through narrow and dimly-lighted lanes, found ourselves on the shingly beach. The tide was beginning to flow; but a large breadth of shore encouraged us to proceed without apprehension, as we soon felt satisfied of the direction of our home. The ladies of our party, however, began to weary; and we were all well nigh exhausted, when we reached a little enclosure upon the margin of the sea, where the road passed round a single cottage. There was a strong light within. I advanced alone, whilst my friends rested upon the paling of the garden. I looked, unobserved, through the rose-covered window. A delicate and graceful young woman was assiduously spinning; an infant lay cradled by her side; and an elderly man, in the garb of a fisherman, whose beautiful grey locks flowed upon his sturdy shoulders, was gazing with a face of benevolent happiness upon the sleeping child. I paused one instant, to look upon this tranquil scene. Everything spoke of content and innocence. Cleanliness and comfort, almost approaching to taste, presided over the happy dwelling. I was just going to knock, when my purpose was arrested by the young and beautiful mother (for so I judged was the female before me) singing a ballad, with a sweet voice and a most touching expression. I well recollect the words, for she afterwards repeated the song at my request:—

SONG OF THE FISHER'S WIFE.

Rest, rest, thou gentle sea,
  Like a giant laid to sleep,
Rest, rest, when day shall flee,
  And the stars their bright watch keep.
For *his* boat is on thy wave,
  And he must toil and roam,
Till the flowing tide shall lave
  Our dear and happy home.

Wake not, thou changeful sea,
  Wake not in wrath and power
Oh bear *his* bark to me,
  Ere the darksome midnight lower;
For the heart will heave a sigh,
  When the loved one's on the deep,
But when angry storms are nigh,
  What can Mary do,—but weep?

The ballad ceased; and I entered the cottage. There was neither the reality nor the affectation of alarm. The instinctive good sense of the young woman saw, at once, that I was there for an honest purpose; and the quiet composure of the old man showed that apprehension was a stranger to his bosom. In two minutes our little party were all seated by the side of the courteous, but independent fisherman. His daughter, for so we soon learnt the young woman was, pressed upon us their plain and unpretending cheer. Our fatigue vanished before the smiling kindness of our welcome; while our spirits mounted, as the jug of sound and mellow ale refreshed our thirsty lips. The husband of the young wife, the father of the cradled child, was, we found, absent at his nightly toil. The old man seldom now partook of this labour. "His Mary's husband," he said, "was an honest and generous fellow;—an old fisherman,

who had, for five and forty years been roughing it, and, 'blow high, blow low,' never shrunk from his duty, had earned the privilege of spending his quiet evening in his chimney-corner; he took care of the boats and tackle, and George was a bold and lucky fellow, and did not want an old man's seamanship. It was a happy day when Mary married him, and God bless them and their dear child!" It was impossible for any feeling heart not to unite in this prayer. We offered a present for our refreshment, but this was steadily refused. The honest old man put us into the nearest path; and we closed a day of pleasure as such days ought to be closed,—happy in ourselves, and with a kindly feeling to all our fellow-beings.

During my short residence at the village I have described, I made several visits to the fisherman's cottage. It was always the same abode of health, and cheerfulness, and smiling industry. Once or twice I saw the husband of Mary. He was an extremely fine young man, possessing all the frankness and decision that belong to a life of adventure, with a love of domestic occupations, and an unvarying gentleness that seemed to have grown in a higher station. But ease, and competency, and luxurious refinement, are not essential to humanize the heart. George had received a better education than a life of early toil usually allows. He had been captivated, when very young, by the innocent graces of his Mary. He was now a father. All these circumstances had formed him for a tranquil course of duty and affection. His snatches of leisure were passed in his little garden, or with his smiling infant. His wife's whole being appeared wrapped up in his happiness. She loved him with a deep and confiding love; and if her hours of anxiety were not unfrequent, there were moments of ecstasy in their blameless existence, which made all peril and fear as a dim and forgotten dream.

Seven years had passed over me, with all its various changes. One of the light-hearted and innocent beings who rejoiced with me in the happiness of the fisherman's nest, as we were wont to call the smiling cottage, was no more. I had felt my own sorrows and anxieties—as who has not; and I was in many respects a saddened man. I was tempted once again to my favourite watering-place. Its beauty was gone. I was impatient of its feverish noise and causeless hurry; and I was anxious to pass to quieter scenes. A recollection of deep pleasure was, however, associated with the neighbourhood; and I seized the first opportunity to visit the hospitable cottage.

As I approached the green lane which led to the little cove, I felt a slight degree of that agitation which generally attends the renewal of a long suspended intercourse. I pictured Mary and several happy and healthy children;—her husband more grave and careful in his deportment, embrowned, if not wrinkled, by constant toil;—the old man, perchance, gone to rest with the thousands of happy and useful beings that leave no trace of their path on earth. I came to the little garden: it was still neat; less decorated than formerly, but containing many a bed of useful plants, and several patches of pretty flowers. As I approached the house I paused with anxiety; but I heard the voices of childhood, and I was encouraged to proceed. A scene of natural beauty was before me. The sun was beginning to throw a deep and yellow lustre over the clouds and the sea; the *old man* sat upon a plot of raised turf at the well-known cottage-door; a net was hung up to dry upon the rock behind him; a dog reposed upon the same bank as his master; one beautiful child of about three years old was climbing up her grandfather's shoulders; another of seven or eight years, perhaps the very same girl I had seen in the cradle, was holding a light to the good old man, who was prepared to enjoy his evening pipe. He had evidently been labouring in his business: his heavy boots were yet upon his legs; and he appeared fatigued, though not exhausted. I saw neither the husband nor the wife.

It was not long before I introduced myself to the "ancient" fisherman. He remembered me with some difficulty; but when I brought to his mind the simple incidents of our first meeting, and more especially his daughter's song, while I listened at the opened casement, he gave me his hand, and burst into tears. I soon comprehended his sorrows and his blessings. Mary and her husband were dead! Their two orphan girls were dependent upon their grandsire's protection.

The 'Song of the Fisher's Wife' was true in its forebodings to poor Mary: her brave husband perished in a night of storms. Long did she bear up for the sake of her children; but the worm had eaten into her heart and *she* lies in the quiet church-yard, while *he* has an ocean grave!

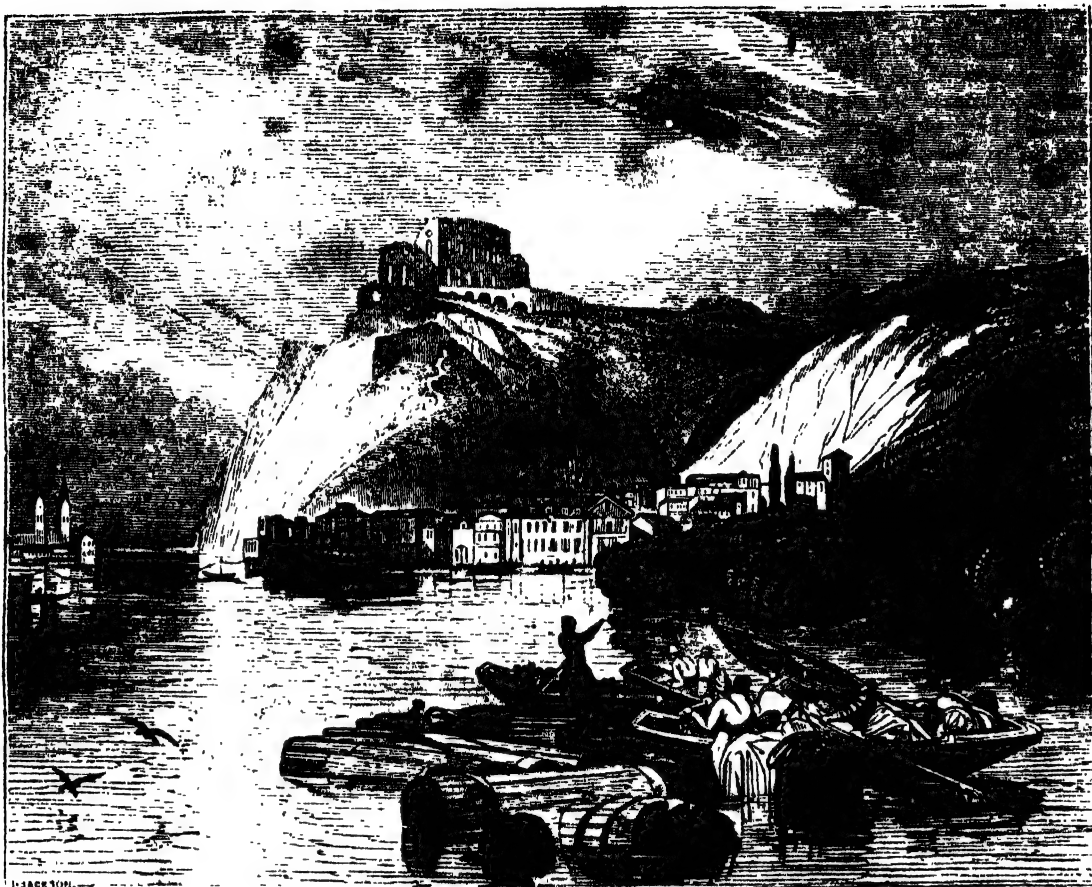
Beautiful, very beautiful, is the habitual intercourse between age and infancy. The affection of those advanced in life for the children of their off-spring, is generally marked by an intensity of love, even beyond that of the nearer parents. The aged have more ideas in common with the young, than the gay, and busy, and ambitious can conceive. To the holy-minded man, who wears his grey locks reverently, the world is presented in its true colours: he knows its wisdom to be folly, and its splendour vanity: he finds a sympathy in the artlessness of childhood; and its ignorance of evil is to him more pleasing than men's imperfect knowledge, and more imperfect practice of good. But the intercourse of my poor old fisherman with his two most dear orphans was even of a higher order. He forgot his age, and he toiled for them: he laid aside his cares, and he played with them: he corrected the roughness of his habits, and he nursed them with all sweet and tender offices. His fears lest they should be dependent upon strangers, or upon public support, gave a new spring to his existence. He lived his manhood over again in all careful occupations; and his hours of rest were all spent with his beloved children in his bosom.

Excellent old man! the blessing of Heaven shall be thy exceeding great reward; and when thou art taken from thy abode of labour and love to have thy virtue made perfect, thou shalt feel, at the moment of parting, a deep and holy assurance that the same Providence which gave thee the will and the ability to protect the infancy of thy orphans, shall cherish and uphold them through the rough ways of the world, when thou shalt be no longer their protector.

Gradations of Drunkenness.—There is a Rabbinical tradition related by Fabricius, that when Noah planted the vine, Satan attended and sacrificed a sheep, a lion, an ape, and a sow. These animals were to symbolise the gradations of ebriety. When a man begins to drink he is meek and ignorant as the lamb: then becomes bold as the lion; his courage is soon transformed into the foolishness of the ape; and at last he wallows in the mire like the sow.—*Warton's Dissertation on the Gesta Romanorum.*

Salt.—There are many countries on the habitable globe where salt has never yet been found, and whose commercial facilities being extremely limited, the inhabitants can only occasionally indulge themselves with it as a luxury. This is particularly the case in the interior of Africa. "It would," says Mungo Park, "appear strange to an European to see a child suck a piece of rock-salt as if it were sugar. This, however, I have frequently seen; although the poorer class of inhabitants are so very rarely indulged with this precious article, that to say that a man eats salt with his provisions, is the same as saying he is a rich man. I have suffered great inconvenience myself from the scarcity of this article. The long use of vegetable food creates so painful a longing for salt, that no words can sufficiently describe it."—*Park's Travels into the Interior of Africa.*

THE CASTLE OF EHRENBREITSTEIN.



[View of Ehrenbreitstein from the Rhine.]

On the right bank of the Rhine, upon the summit of a rocky hill, directly opposite to the city of Coblentz, stands the Castle of Ehrenbreitstein ("the broad stone of honour"). It is now one of the strongest fortresses in Europe, both in respect of its natural position, and its artificial defences. It was originally a Roman camp, was renovated in 1160, and afterwards repaired and enlarged by the Elector John, Margrave of Baden, who dug a well of the depth of 280 feet, which was afterwards sunk 300 feet further. During the revolutionary war, the castle was exposed to many hazards. General Marceau blockaded it for a month when the French army first passed the Rhine, in September 1795. It was twice blockaded in 1796, and cannonaded the second time from the neighbouring heights of Pfaffendorf and Arzheim, without sustaining any injury. The French got possession of the height of Rellenkopf, but without any further success, and the retreat of General Jourdan obliged them to raise the siege. It was again blockaded in 1797 by the French General Hoche, who kept it so till the peace of Léoben; and in 1798 it was once more blockaded by the French, whilst the Congress of Radstadt was sitting, and was reduced to such a state of famine, that the defenders are said to have lived, among other things, upon cats and horse-flesh; cats being sold at three francs each, and horse-flesh at a franc per pound. In spite of the exertions of the commandant, Colonel Faber, and his earnest representations to the Congress, the castle was left to its fate, and finally surrendered to the French in January 1799. The French blew up and otherwise destroyed great part of the works; and the view above given shows it in the state to which it was reduced by them. The convention of Paris at the termination of the war, in 1815, determined to re-establish the fortifications, and Ehrenbreitstein, with the adjoining fortifications of the Chartreuse and Petersberg, is now the most important fortress of the German frontier. The ancient monastery of the Chartreuse commands the approaches from Mayence and Hundsruch; Petersberg, those of Trêves and Cologne; and Ehrenbreitstein, the Rhine and the road from Nassau. The form and durability of the new works have been much admired. They have been constructed from the plans of Montalembert and Carnot, and the castle has received the official name of "Fort Frederic-William," from the present King of Prussia. The works are shown to visitors, on their obtaining permission of the commandant.

The view from the summit of the castle is a very rich and extensive one. Before you is Coblentz, its bridge of boats, and its two islands on the Rhine; behind it, the village and the beautiful ruins of the Chartreuse, upon a hill covered with vines and fruit-trees. The scope of the view embraces more than thirty towns and villages. The Rhine flows majestically beneath it, and is here at about the widest part of its course. The space of about 120 miles between Mayence and Cologne, in which Coblentz stands midway, is that where the Rhine is broadest, and its scenery the most picturesque. The view of this old castle naturally leads us to reflect on the degree in which modern Europe has ceased to resemble the classic ages in which Ehrenbreitstein was founded, or the feudal ages to which so much of its history belongs. It still bears the name of "the broad stone of honour," though many say that the days of honour have passed away with the days of chivalry. But if honour, in these times, has become rather a synonymous term for honesty and good faith, than the fantastic touchstone of chivalry, we have gained greatly by the change. The middle ages were not without their virtues, but they were all of a romantic kind. In the present times, it is to the inculcation of practical

morality, the establishment of just laws, and the influence of a due sense of the plain and simple truths of religion, that we must look for the advancement of integrity and virtue among communities. The middle ages were too fertile in oppression, in crime, and in misery, to be regarded with any thing like regret that their character and spirit have not been stamped upon the times in which we are living.

THE HOTTENTOTS.



[From an original drawing of an old Hottentot herdsman—taken from life.]

Mild, melancholy, and sedate, he stands,
Tending another's flock upon the fields,
His father's once, where now the white man builds
His home, and issues forth his proud commands.
His dark eye flashes not; his listless hands
Lean on the shepherd's staff; no more he wields
The Libyan bow—but to th' oppressor yields
Submissively his freedom and his lands.
Has he no courage?—once he had—but, lo!
Hard servitude hath worn him to the bone.
No enterprise?—alas! the brand, the blow,
Have humbled him to dust—ev'n *hope* is gone.
"He's a base-hearted hound—not worth his food"—
His master cries—"he has no GRATITUDE!"

WHEN the Dutch began to colonize the southern angle of the African continent, about the middle of the seventeenth century, they entered the country as friends, and easily obtained from the natives, for a few trinkets and flasks of brandy, as much territory as was required for their infant settlement. The native inhabitants, afterwards known by the name of HOTTENTOTS*, are described by the best authorities as being at that period a comparatively numerous people. They were divided into many tribes or classes, under the patriarchal rule of their respective chiefs or elders: and as they did not, like the Caffers, cultivate grain or esculents, their only steady occupation was the care of their flocks and herds. Enjoying a serene and temperate climate, little clothing or shelter was sufficient for their wants. A mantle formed of sheep-skins sewed together with threads of sinew, and rendered soft and pliable by friction, sufficed for a garment by day and a blanket by night. A hut, framed of a few boughs or poles covered with rush-mats, and adapted to be conveyed like a tent on the backs of their pack oxen, was a sufficient protection from the weather. A bow and poisoned arrows, and the light spear or javelin, now known by the name of assagai, were their only arms, and were used alike for war or the chase. They were then (as their descendants continue to be) bold and ardent huntsmen; for, with the formidable beasts of prey which inhabit the country, they had to maintain incessant warfare in defence of their flocks, and in contending for the dominion of the desert. They had also their quarrels and wars with each other; but these appear to have been generally conducted with as moderate a degree of bloodshed and ferocity as is to be found among any people in a similar state of society. Yet, though of a mild and somewhat inert disposition, they were by no means deficient in courage. They defeated and slew Almeida, the first viceroy of the Portuguese in India, in an obstinate engagement at the Salt River, near the spot where Cape Town now stands; and in Dr. Philip's valuable 'Researches in South Africa' will be found recorded, upon the authority of their Dutch invaders, acts of bravery and heroic devotion exhibited by individuals of this race, scarcely to be surpassed in the history of any other people.

For a considerable period the intercourse between the European settlers and the natives continued on an amicable footing. The territorial occupation of the country was not at first the object of the Dutch East-India Company, under whose control the settlement was placed; and there was neither mineral wealth nor extraordinary fertility of soil, to tempt the forcible appropriation of native labour in a way similar to what occurred in the West Indies, Mexico, and Peru. At length, however, the Dutch settlers discovered that though the country furnished neither gold nor silver, nor any of the much prized tropical products, it was well adapted for the culture of corn and wine, and for the rearing of flocks and herds, almost without limit. Emigrants accordingly began to flock to South Africa; and the "white man's stride*," with or without the nominal acquiescence of the natives, was gradually extended. After the lapse of a century and a half, the European intruders had acquired possession of nearly the whole of the extensive region now embraced by the colonial boundary, including the entire country inhabited by the Hottentot race, with the exception of the arid deserts which afford a refuge to the wandering Namacqua and Bushman hordes, and which are too sterile and desolate to excite the cupidity of any class of civilized men.

But it was not the soil of their country merely of which the Hottentots were deprived in the course of these encroachments. In losing the property of the soil, they also gradually lost the privilege of occupying even the least valuable tracts of it for pasturing their flocks and herds—their only means of subsistence. People without land could have no occasion for cattle—no means of supporting them. Their flocks and herds,

* "The name," says Mr. Barrow, "that has been given to this people is a fabrication. *Hottentot* is a word that has no place or meaning in their language; and they take to themselves the name under the idea of its being a Dutch word. Whence it has its derivation, or by whom it was first given, I have not been able to trace. When the country was first discovered, and when they were spread over the southern angle of Africa, as an independent people, each horde had its particular name; but that by which the collective body as a nation was distinguished, and which at this moment they bear among themselves in every part of the country, is *Quaiquae*."—*Barrow's Travels in Southern Africa*, vol. i. p. 100.

* The usual mode of measuring out a new farm, during the Dutch occupation, was for the *Veld-wagt-Meester* of the district to *stride*, or pace, the ground; and half an hour's stride in each direction from the centre, or one hour's walk across the *Veld* (country) was the regulated extent of the farms.—See *Barrow* vol. i p. 29.

accordingly, also passed by degrees into the possession of the colonists. Nothing then remained of which to plunder them save the property of their own persons; and of that, the most sacred and unalienable of all property, they were also at length virtually deprived. The laws enacted by the Dutch Home Government, it is true, did not permit the Hottentots to be publicly *sold*, from owner to owner, as negro slaves and other farm stock were sold (and are still sold) in the same colony; but by the colonial laws and usages they were actually deprived of a right to their own labour, and reduced to a condition of degrading, grinding, and hopeless bondage, in some respects even more intolerable than colonial slavery of the ordinary description.

Le Vaillant has given a very lively, and upon the whole, a just and accurate description of the Hottentots in their wild or semi-nomadic state. Mr. Barrow has described, in a less ambitious style, but with equal force and accuracy, their character and condition as he found them at a somewhat later period (1797), after they had been as a people generally subdued under the colonial yoke; and he exposes, with a warmth which does honour to his feelings, the iniquitous and inhuman conduct of their European oppressors. To enable the reader properly to understand the situation of this people at the present time, we must give a brief view of them when Mr. Barrow was Auditor-General of Public Accounts at the Cape in 1798,—and this we cannot do in any other form so well as in that writer's own words.

After mentioning the comparative happiness and more numerous population of the Hottentots in their independent state, which in the eastern part of the colony existed so late as to about twenty years before the period of his travels, Mr. Barrow thus proceeds:—

"Some of these villages might have been expected to remain in this remote and not very populous part of the colony. Not one, however, was to be found. There is not, in fact, in the whole extensive district of Graaff-Reynet, a single horde of independent Hottentots; and perhaps not a score of individuals who are not actually in the service of the Dutch. These weak people, the most helpless, and in their present condition perhaps the most wretched, of the human race, duped out of their possessions, their country, and their liberty, have entailed upon their miserable offspring a state of existence to which that of slavery might bear the comparison of happiness. It is a condition, however, not likely to continue to a very remote posterity. Their numbers of late years have been rapidly on the decline. It has generally been observed that wherever Europeans have colonized, the less civilized nations have always dwindled away, and at length totally disappeared." After specifying some other causes which he imagines may have contributed to the depopulation of the Hottentots, Mr. Barrow proceeds:— "To these may be added their extreme poverty, scantiness of food, and continual dejection of mind, arising from the cruel treatment they receive.

"There is scarcely an instance of cruelty said to have been committed against the slaves in the West-Indian islands, that could not find a parallel from the Dutch farmers of the remote districts of the colony towards the Hottentots in their service. Beating and cutting with thongs of the hide of the sea-cow (hippopotamus) or rhinoceros are only gentle punishments, though these sort of whips, which they call sjamboes, are most horrid instruments, being tough, pliant, and heavy almost as lead. Firing small shot into the legs and thighs of a Hottentot, is a punishment not unknown to some of the monsters who inhabit the neighbourhood of Camtoos River.

"By a resolution of the old government, as unjust as it was inhuman, a peasant (colonist) was allowed to claim as his property, till the age of five and twenty, all the children of the Hottentots in his service to whom he had given in their infancy a morsel of meat. At the expiration of this period the odds are ten to one that the slave is not emancipated. But should he be fortunate enough to escape at the end of this period, the best part of his life has been spent in a profitless servitude, and he is turned adrift without any thing he can call his own, except the sheep's-skin on his back." Again, speaking of "those Hottentots living with the farmers of Graaff-Reynet in a state of bondage," Mr. Barrow adds, "it is rare to observe the muscles of his face relaxed into a smile. A depressed melancholy and deep gloom constantly overspread his countenance.

"Low as they are sunk," he continues, "in the scale of humanity, their character seems to have been generally much traduced and misrepresented. It it true there are not many prepossessing features in the appearance of a Hottentot, but many amiable and good qualities have been obscured by the ridiculous and false accounts with which the world has been abused. They are a mild, quiet, and timid people; perfectly harmless, honest, and faithful; and, though extremely phlegmatic, they are nevertheless kind and affectionate to each other, and by no means incapable of strong attachments. A Hottentot will at any time share his last morsel with his companions. They seldom quarrel among themselves or make use of provoking language. They are by no means deficient in talent, but they possess little exertion to call it into action." [How could we expect *exertion* from men in the condition described?]

"The person of a Hottentot while young is by no means devoid of symmetry. They are clean-limbed, well-proportioned, and erect. Their hands, their feet, and all their joints are remarkably small. Their cheek-bones are high and prominent, and with the narrow-pointed chin form nearly a triangle. The nose is in some remarkably flat, in others considerably raised. The colour of the eye is a deep chesnut; and the eyelids at the extremity next the nose, instead of forming an angle, as in Europeans, are rounded into each other exactly like those of the Chinese, to whom indeed in many other points they bear a physical resemblance that is sufficiently striking. Their teeth are beautifully white. The colour of the skin is that of a yellowish brown, or a faded leaf, but very different from the sickly hue of a person in the jaundice which it has been described to resemble: many indeed are nearly as white as Europeans. Some of the women, when young, are so well formed that they might serve as models of perfection in the human figure. Every joint and limb is rounded and well turned, and their whole body is without an angle or disproportionate protuberance. Their hands and feet are small and delicately turned; and their gait is not deficient in easy and graceful movements. Their charms, however, are very fleeting." He then describes their ugliness generally at a more advanced age.

Such, with the omission of some details, is the description of the Hottentots given by Mr. Barrow in his very instructive and able work on South Africa. To its accuracy in almost every point the writer of this notice can bear witness; and his object in introducing it here is partly with a view to counteract the exaggerated notions that still generally prevail in England respecting the physical deformity and moral debasement of this long oppressed and calumniated race of men; and partly to enable the reader fully to appreciate the wretchedness of the condition from which they have been at length raised by the tardy justice of the British government. Four years and a half ago, namely in July 1828, the Hottentot Helots of the Cape, 30,000 in number, were emancipated from their long and grievous thraldom, and admitted by law to all the rights and privileges, civil and political, of the white colonists. Their actual condition just before this important change took place, (of which the present writer had personally the very best opportu

nities of judging upon the spot,) and their progress since, in morals, religion, and industry—in all that distinguishes the civilized from the savage state of man,—will form the subject of a subsequent article.

SIMPLIFICATIONS OF ARITHMETICAL RULES.

No. 3.

We will now suppose a daily sum to be given, of which we require to know the amount in a year. If the daily sum consist only of pence and farthings, the rule is extremely simple, as follows:—Suppose I wish to know how much seventeen-pence three farthings per day will give in a year. Let every penny be turned into a pound, and every farthing into five shillings which gives £17. 15*s*. Halve this, which gives £8. 17*s*. 6*d*. Now let every penny be a sixpence, and every farthing three half-pence, which gives £0. 8*s*. 10½*d*. Add the three together—

£.	s.	d.
17	15	0
8	17	6
0	8	10½
27	1	4½

This is too much by one day's allowance; subtract therefore one day's allowance, or 1*s*. 5¾*d*., and the result is £26. 19*s*. 10¾*d*. which is quite correct.

This rule is founded on the accidental circumstance that the number of days in a year being made up of 240, the half of 240, and 5, every penny per day gives a pound, half a pound, and 5 pence per year.

When the number of pounds, shillings, and pence is too great to be conveniently reduced to pence, proceed as follows:—Take the pounds and shillings only, convert the shillings as in No. 1 of this series; that is, divide by 2, and if there be a remainder, write a 5 after the quotient. Thus, if the daily sum be £2. 7*s*. 8¾*d*. take £2. 7*s*. only, which converted, gives 235. Annex ciphers, so that there shall always be *five* places besides the pounds. This gives 235,000. (Had it been £2. 8*s*. we should have had 240000, with four ciphers.) Divide 235000 by 4, which gives 58750; cut off one cipher from the dividend, which gives 23500; do this again, which gives 2350; halve this, which gives 1175; add the four together; so that the process stands thus:—

```
4)235000
  ------
   58750
   23500
    2350
    1175
  ------
   85775
```

Cut off the two last places, 75, and reconvert them into shillings by multiplying the first figure by 2, and adding 1 if the second figure be 5, as in the present case. This gives 15 shillings. Let all the remaining figures be pounds, which gives £857. 15*s*. the correct amount of £2. 7*s*. per day in a year. For the 8 pence 3 farthings which is left, proceed as in the first example. We give the steps arising from the first rule:—

	£.	s.	d.
Add . .	8	15	0
	4	7	6
		4	4½
	13	6	10½
Subtract			8¾
At 8¾*d*. per day	13	6	1¾
At £2. 7*s*. per day	857	15	0
	871	1	1¾

which is the amount of the whole. The reader must not imagine that he will work the first example by this as quick as by the common method, but when he thoroughly knows the rule, he will not only work more quickly, but with much less chance of error. There are very few people who can multiply a number of pounds, shillings, pence, and farthings by 365 correctly, in any reasonable time.

If it be judged sufficiently accurate to solve the question within a few shillings, the method for pounds, shillings, and pence may be used as follows, which will always give the result within 8 shillings:—Convert the shillings, pence, and farthings, as in No. 1, and put ciphers, so as to make *five* places besides the pounds. Thus, for £2. 7*s*. 8¾*d*. we have 238600: for £190. 17*s*. 6*d*. we have 19087500; for £17. 10*s*. we have 1750000. With this, follow exactly the second process in this paper; we here give the one for £2. 7*s*. 8¾*d*.—

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4)238600
  ------
   59650
   23860
    2386
    1193
  ------
   87089
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Cut off the two last places, and annex a cipher, which gives 890; convert these into shillings and pence by No. 1, which gives 17*s*. 9¾*d*.: make the other figures pounds, which gives £870. 17*s*. 9¾*d*., which is within 4 shillings of the truth.

We shall proceed in our next to the reverse process.

NEWSPAPERS.

Some centuries back by far the greater proportion of the middle classes in this country were wholly ignorant of passing public events, while the working classes seldom inquired about anything beyond their immediate callings.

How much we are advanced as a nation in this respect may be seen from the following statement.

The first attempt at periodical literature was made in England in the reign of Elizabeth. It was in the shape of a pamphlet, called the 'English Mercurie;' the first number of which, dated 1588, is still preserved in the British Museum. There were, however, no newspapers which appeared in England in single sheets of paper as they do at present, until many years after that time. The first newspaper, called 'The Public Intelligencer,' was published by Sir Roger L'Estrange, on the 31st August, 1661. Periodical pamphlets, which had become fashionable in the reign of Charles I., were more rare in the reign of James II. The English rebellion of 1641 gave rise to a great number of tracts filled with violent appeals to the public: many of these tracts bore the title of *Diurnal Occurrences of Parliament*. The first Gazette in England was published at Oxford, on November 7th, 1665, the court being then held there. On the removal of the court to London, the title was altered to *The London Gazette*. *The Orange Intelligencer* was the third newspaper published, and the first after the revolution in 1688. This latter continued to be the only daily newspaper in England for some years; but in 1690 there appear to have been nine London newspapers published weekly. In Queen Anne's reign (in 1709) the number of these was increased to eighteen; but still there continued to be but one daily paper, which was then called *The London Courant*. In the reign of George I. the number was three daily, six weekly, and ten published three times in the week.

In 1753 the number of copies of newspapers annually published in the whole of England was 7,411,757. in 1760 the circulation had increased to 9,404,790; and in 1830 it amounted to 30,493,941.

The following Table shows the advance of newspapers during half a century:—

Newspapers published in . .	1782	1790	1821	1833
England	50	60	135	248
Scotland	8	27	31	46
Ireland	3	27	50	75
Total of the United Kingdom	61	114	216	369

Of the 369 newspapers now published in the United Kingdom, the following is the division:—

In England:	
Daily, in London	13
Two or three times a week	6
Once a week	36
Country newspapers	180
British Islands:—Guernsey, Jersey, and Man, (two of which are twice a week, eleven weekly)	13
In Scotland:	
Twice and three times a week	15
Weekly	31
In Ireland:	
In Dublin, five daily;—seven three times a week;—six weekly	18
Rest of Ireland, thirty-five three times or twice a week;—twenty-two weekly	57
	369

HANDEL.

On the 24th, or, according to the inscription on his monument, the 23d of February, was born at Halle, in Lower Saxony, the great musical composer, George Frederic Handel. His father was a physician, and was desirous of educating his son for the law; but from his earliest years the boy showed a passion for music, which nothing was able to overcome. Forbidden to touch a musical instrument, he would spend the greater part of the night, after the rest of the family were asleep, in practising upon a small clavichord, which he kept concealed in a garret; and in this way he attained such proficiency, that having, while yet a mere child, contrived to steal an opportunity of playing on the church organ before the court at Saxe Weisenfels, he surprised and charmed all who heard him with the excellence of his performance. On this his father, prevailed upon by the request of the duke, consented to allow him to adopt the profession for which he seemed destined by nature. He was then placed under the care of a master, and profited so greatly by the regular instruction which he now received, that he was soon able to preside as leader of the choral services in the cathedral. When he first used, occasionally, to undertake this duty he was no more than nine years of age. He had also already begun to exercise his genius and theoretical knowledge as a composer, with striking success. When in his nineteenth year he repaired to Hamburgh, and there obtained an engagement in the orchestra of the opera. On the 30th of December, 1704, he brought out at that theatre his 'Almira,' his first opera, and, in the February following, his 'Nero.' These works, and his other professional exertions, at length brought him a sufficient sum of money to enable him to gratify his desire of making a journey to Italy. From that country, after having visited in succession, Florence, Venice, Naples, and Rome, he retured to Germany in 1710, and soon after, on the invitation of several persons of distinction in England, came over here. The reception which he met with induced him to make this country his home for the rest of his life. Queen Anne granted him a pension of £200; and that sum was augmented when George I. came to the throne. His first great patron was the Earl of Burlington, with whom he resided from 1715 till 1718; when he accepted from the Duke of Chandos the appointment of director of the choir which that nobleman had established at his seat at Cannons. In 1720 the Royal Academy of Music was instituted, and Handel placed at its head. His own compositions were the pieces principally performed; but a violent quarrel with some of the other musicians broke up the institution after it had subsisted only for ten years—a period which has been characterized as the most splendid era of music in England. The next great event in Handel's life was the production of his master-effort, the oratorio of the Messiah, which he brought out in 1741. This magnificent composition was somewhat coldly received on its first representation, but it soon came to be more correctly appreciated; and it has long ranked in the estimation of all competent judges as one of the most sublime works in the whole range of music. It deserves to be mentioned as an instance of Handel's liberality, that on the opening of the Foundling Hospital, he not only presented an organ to the chapel, but gave the institution the benefit of a performance of his 'Messiah' conducted by himself, and repeated the same kindness for several years. He also bequeathed the music of this oratorio to the hospital at his death. That event took place on the 14th of April 1759, when the illustrious musician was in the seventy-sixth year of his age. He had been for some time before wholly blind. In 1784, a century after his birth, a commemoration of Handel was performed in Westminster Abbey, where his remains had been interred; it was one of the grandest musical displays ever witnessed in any country. The music was all selected from his own works; and the vocal and instrumental performers together, were five hundred and twenty-five in number. The king and queen and a large proportion of the nobility attended; and the whole number of persons present was not much under four thousand. The performance lasted for four days, namely, the 26th and 29th of May, and the 3d and 5th of June. It was annually repeated for six years in the same place, and after that for a year or two in St. Margaret's Church. One celebration of it also took place in the Chapel Royal at Whitehall, which was the last.



[Portrait of Handel.]

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

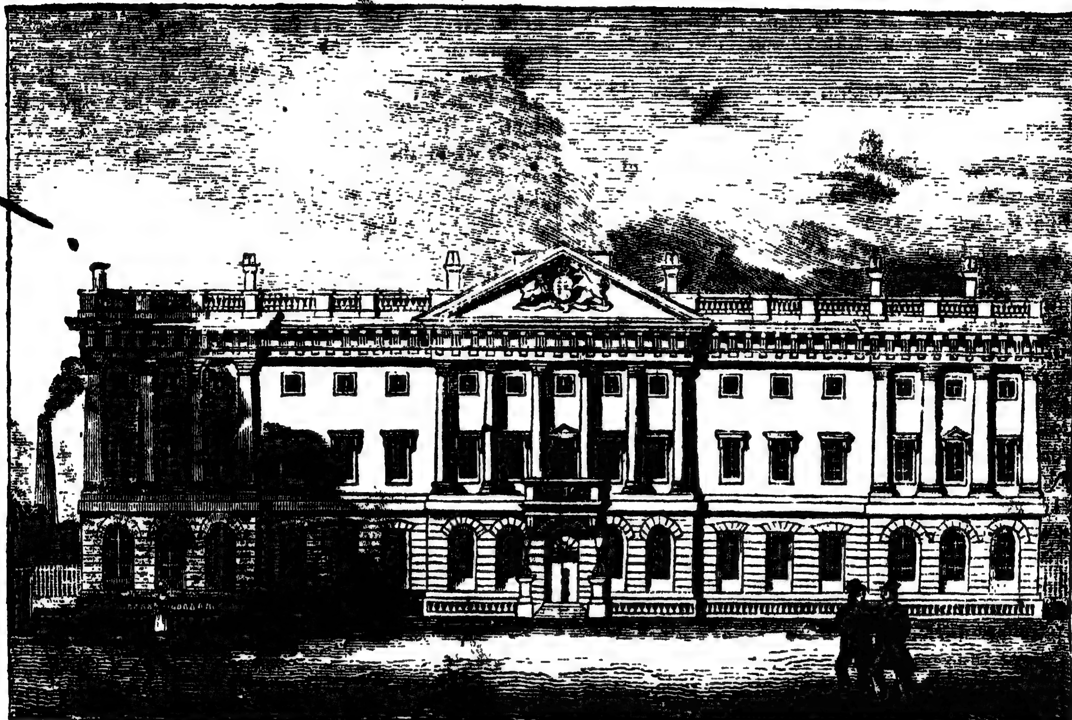
LONDON:—CHARLES KNIGHT, PALL-MALL EAST.

Printed by William Clowes, Stamford Street.

Monthly Supplement of
THE PENNY MAGAZINE
OF THE
Society for the Diffusion of Useful Knowledge.

58.] January 31 to February 28, 1833.

THE MINT



[Front of the Mint from Tower Hill.]

On the north-east side of Tower Hill is situated the building erected some years since from the designs, and under the direction of Mr. Smirke, for conducting the business of the coinage, which was at that time removed from the Tower. "The Royal, or National Mint," it is stated in the 'Memoirs of the Tower,' by Britton and Brayley, "was formerly an appendage to the Tower, and appears to have been established there in or before the time of Edward I., when, according to Madox, there were no less than thirty furnaces employed. The privilege of coining was frequently granted to corporate and ecclesiastical bodies, and to private noblemen; which occasioning great inconvenience, it was enacted in the time of Queen Elizabeth, that all the provincial mints should be suppressed, and no coinage allowed but at the Royal Mint, in the Tower. This law, with the exceptions of two cases of emergency, in the times of Charles the First and William the Third, was observed until about twenty years ago." In consequence, then, of the vast increase of business in this department, arising from the augmented population of the country, and other causes, the Goverment gave orders for the erection of the present edifice. It is a handsome structure, in the Grecian style of architecture, having a centre and wings, and an elevation of three stories. The centre is ornamented with columns, (over which is a pediment containing the British arms,) and the wings with pilasters. The roof is enclosed by an elegant balustrade. The principal officers of the establishment are provided with houses on each side of the building, which, being of brick, do not harmonize with the principal edifice. The interior is lighted with gas, and every advantage derivable from mechanical contrivance has been here introduced to facilitate the operation of coinage; but no visitor is admitted to inspect the works without a special order from the Master of the Mint, which office is at present held by the Right Hon. Lord Auckland.

THE NATIONAL GALLERY.

We have, from time to time, published remarks on the more important of the pictures forming the Angerstein, or National Gallery, to which the public have free access. As many of our readers are aware, Parliament has voted a sum for the erection of a more suitable building for their exhibition; and we may therefore properly give a brief account of the formation of this collection, and of the advantages which are contemplated by the proposed expenditure of public money upon this object.

The establishment of a National Gallery of Paintings to which, as public property, every individual should have free admission, was an event hailed with pleasure not only by the lovers of art, but by every man who felt for the honour of his country. It was a humiliating reflection that London was the only capital in Europe not possessed of such an institution, and that every

other nation had preceded us in the just appreciation of the Fine Arts, whether considered as a means of commercial advantage by the improvement of manufactures consequent on their cultivation, or as a source of social refinement and intellectual pleasure. Until a very recent period English history presents us with a dead blank in whatever relates to the Fine Arts. Some eminent foreign painters had at intervals found employment here, but no public gallery, nor institution of any kind, had been established, tending to the formation of public taste, or to stimulate and direct the talents of native artists. During the earlier part of the reign of George III., however, much was done with the intention of promoting the progress of the Fine Arts; and it is not improbable that a National Gallery would have been established during the time of that monarch, but for the great events which agitated Europe, and which absorbed public attention, to the exclusion of all minor considerations. After the general peace Government found itself more at leisure for domestic improvement, and we are indebted to the administration of Lord Liverpool for the accomplishment of the desirable object of the establishment of a National Gallery. In the year 1823 the fine collection of Mr. Angerstein was, in consequence of his death, offered for public sale, and Government determined to avail itself of the opportunity to commence the formation of a public collection. In the choice of his pictures Mr. Angerstein had availed himself of the judgments of the most distinguished artists of the day—of Sir Thomas Lawrence, and Mr. West particularly; and the collection, although not numerous, being of unquestionable excellence, was considered to be well calculated to form the nucleus of a National Gallery. The proposition of his Majesty's ministers met with the prompt acquiescence of Parliament, and a grant was made of £57,000, the price demanded for the collection, which comprised thirty-eight pictures by the most eminent masters. In the session of 1825 a farther sum of 14 or £15,000 was voted unanimously for the purchase of four pictures, in addition to those of Mr. Angerstein. The management of the establishment was intrusted, in the first instance, to the Marquis of Stafford, Lord Farnborough, Sir George Beaumont, and Sir Thomas Lawrence; since the death of the two latter, Lord Dover has been added to the list.

It was conjectured that the National Gallery would become enriched by gifts and bequests of fine works of art, presented from time to time by liberal and patriotic individuals. Nor has this expectation been disappointed. For the first example in the shape of donation the public is indebted to Sir George Beaumont, Bart. This gentleman, although not a professor, was distinguished by his practical talents in painting; he was a liberal patron of the arts, and his taste and judgment are evinced in the choice of those pictures, sixteen in number, of which he made a free gift to the National Gallery. His example was followed by a munificent bequest of thirty-two pictures of a very high class by the Rev. Holwell Carr; and an addition of twenty other paintings has been made, presented by different individuals, or purchased by Government. Among the recent donors of pictures to the National Gallery are to be enumerated—his Majesty, the Governors of the British Institution, the Marquis of Stafford, the Earl of Liverpool, Lord Farnborough, G. J. Cholmondely, Esq., M. M. Zachary, Esq., the Rev. William Long, and William Wilkins, Esq.

That there is no natural inaptitude in the English people for the Fine Arts is evident from the fact that the importation of pictures into this country began almost with the resuscitation of the arts in Italy in 1500, and has ever since been continued almost without intermission. But the works thus imported, not having been consigned, as is usually the case on the Continent, to public galleries, little has been known of them; and it is only by accidental visits to the residences of noblemen and gentlemen who possess those treasures of art, that we obtain an idea of the almost boundless wealth of the country in this particular. We think it not hazarding too much to say that there is a greater number of fine pictures in England than in all the other countries of Europe together; and we doubt not that the National Gallery will, in process of time, through Government purchases, gifts, and bequests, exhibit the most splendid collection of pictures which has ever been accumulated in one establishment. The collection at present consists of one hundred and ten pictures

Next to the acquisition of these fine pictures, it is a subject of congratulation that Parliament has given its sanction for the erection of a building calculated for their proper display, and worthy, we trust, to be called a National Gallery. The estimated expense of the building is £50,000. It will be 461 feet in length and 56 feet in width, and it will consist of a centre and two wings. It is to be built on the northern side of the large open space at Charing-Cross. The western wing, it is said, will contain on the ground-floor rooms for the reception of records; above will be the picture gallery, divided into four apartments; and the length of wall assigned for the hanging of pictures will be at least 700 feet. This would admit three or four times as many pictures as the premises where they now are, so that abundant room will be left for new pictures, whenever they may be obtained, either by gift or purchase.

The eastern wing, of similar extent, will contain, on the ground-floor, a hall of casts, the library and council room of the Royal Academy, and a dwelling for the keeper.

We have already adverted to the commercial advantages of the general cultivation of a love for the Fine Arts. It has been thought by some that we have bestowed too much attention upon these subjects in this publication. Our principal object has been to raise the standard of national taste, and open new sources of individual enjoyment;—but we beg to direct our readers to the following statement regarding the silk manufactures of Lyons, for the purpose of showing the direct importance of such subjects to the intelligent artisan—to him whose business is to unite elegance and usefulness.

The cultivation of taste, as applicable to the manufacture of fancy goods, is made an object of much greater attention in France than in England. French silks excel ours in the beauty of their patterns rather than in the quality of their texture. Up to the period in which the pattern is produced, our neighbours have greatly the advantage over us; they can claim no superiority after the pattern is produced, or, in other words, "when the machine gets possession of the design."

Dr. Bowring, in his evidence before a Select Committee of the House of Commons on the Silk Trade, states that he was extremely surprised at finding among every body connected with the production of patterns, including weavers and their children, an attention devoted to every thing which was in any way connected with beauty, either in arrangement or in colour. He mentions having again and again seen the weavers walking about gathering flowers in the fields and arranging them in their most attractive grouping. These artisans are constantly suggesting to their masters improvements in their designs; and, it is said that, in almost every case where the manufacturer has had great success there is always some individual in the factory who is the inventor of beautiful patterns.

We do not possess in England the same means of developing taste which they have in France. There the beauty of the designs is not left to the chance aptitude of individuals employed. The invention of patterns for fancy silks is treated as an object of so great importance, that in Lyons *a school of art* is established expressly for

that purpose, and placed immediately under the protection of Government as well as of the municipal authorities of the city. It is supported principally out of the funds of the city, assisted by an annual grant from Government; the students are instructed gratuitously. Any youth who shows the least aptitude for drawing, or for any other pursuit which may tend to the improvement of the manufacture, is gladly admitted into this establishment. From one hundred and fifty to one hundred and eighty students, and sometimes as many as two hundred at one time, receive the benefit of instructions here given in every branch pertaining to the Fine Arts. Five or six professors are attached to this school. The professor of painting is a man highly distinguished in the world of art. A number of the pupils are engaged in the study of anatomy. Many students are engaged in the delineation of the living human form. "I found," says Dr. Bowring, "a very beautiful child of three or four years old with thirty or forty students sitting round it." In another department the professor of architecture directs the studies of some of the pupils; he makes them intimately acquainted with every variation of the different styles, and it is his principal aim to prevent their confusing these one with the other. The knowledge of architecture is considered of importance for the invention of patterns of a stiff and formal character; as by this means their ornaments are correct and appropriate. A botanical professor has thirty or forty boys under him, engaged in copying the most beautiful flowers. A botanical garden is attached to the school. The most tasteful grouping of flowers is made an object of attention. A general professor of drawing gives instruction in landscape, and, in fact, in all the departments of art which can in any way be made available to the production of tasteful things. The object of another professor is to show the young men how their productions may be rendered applicable to the manufactures; that is to say, how, by machinery, they can produce on a piece of silk cloth that which they have drawn on a piece of paper. The students receive a course of five years' instruction in this school; they are supplied with every thing but the materials on which they work, and their productions are regarded as their own property.

The French manufacturer considers that his pattern is the principal element on which he is to depend for his success; the mere art of manufacturing may be easily effected. He goes therefore to this "taste-producing" school, where he may select, from nearly two hundred boys, one whose taste is most distinguished; that boy is admitted into his house, probably at a small salary. The student thus taken out of the school soon obtains 1000 francs, or about £40 per annum. If his success is great his salary is increased to 2000, and then 3000 francs; and very often the offer of partnership is made to those who have particularly distinguished themselves in their branch of the art. It is said that a great number of the most prosperous manufacturers of Lyons were originally students of this school. Thus all the painters, all the sculptors, and all the botanists at Lyons become manufacturers, and scarcely ever go out of the manufacturing circle. They receive the best instruction gratuitously, and are then at once qualified to earn their subsistence. By applying their talents to the production of patterns they are almost sure of a certain means of advancement; and thus there are few who are tempted into the higher walks of art where they would have to struggle with difficulty and uncertainty.

The inventive powers of the designer are in constant requisition in France, as but comparatively few pieces of one pattern are manufactured. It is stated on good authority that the greatest number of pieces of the most approved pattern never exceeds one hundred—the average number is considered to be about twenty-five.

CARTOONS OF RAFFAELLE, No. 3.

THE DEATH OF ANANIAS.

The judgment of Raffaelle is evinced as much in the choice of his subjects as in his manner of treating them. He seizes invariably on the leading points both of the general and the particular narrative, and the Cartoons may be said to furnish a compendium of the early history of the promulgation of the Christian faith. In the cartoon of "Peter receiving the Keys,"* Christ delivers his last charge to his disciples; in that of "Paul preaching," we see that the divine mission is carried into effect. St. Paul, however, appears at Athens only as the inspired preacher; but the superhuman attributes with which the disciples were invested after the death of Christ, are more strikingly exhibited in the cartoons of "the Healing the Cripple," "Elymas the Sorcerer," and "the Death of Ananias." Here the Apostles act more obviously with the authority of divine power; and the miracles which they perform illustrate the tenets and attest the truth of their doctrine. The consolation and relief announced to the poor and the afflicted are given to the cripple who is healed at the gate of the temple; whilst the penalties denounced on sin are exemplified in the punishments inflicted on Elymas, and on Ananias.

After the miraculous preaching on the day of Pentecost, and the astonishing cure of the cripple by St. Peter, proselytism increased rapidly, and converts came over in multitudes. These primitive Christians embraced in the largest and most literal sense the benevolent and self-denying principles of the new creed; laying their goods at the feet of the Apostles, "they were of one heart and of one soul, and had all things in common." These events form the groundwork of the cartoon of the Death of Ananias. The Apostles are collected beneath a spacious but humble roof, suited to the humility of their temporal pretensions; as preachers and instructors they stand on an elevated platform, which gives them their due place and importance in the composition; but to obviate the appearance of mere homeliness and meanness, this enclosure is hung with a slight drapery, and enclosed by a railing. On the right, groups of converts are entering, bearing offerings of various descriptions, which the Apostles are distributing on the opposite side to various applicants. Among the proselytes came Ananias, a calculating and sordid spirit, who was willing to purchase the advantages of the new communion, but unable to resist the instigations of habitual avarice. He had sold a piece of land, the value of which he professes to offer to the Apostles; but while pretending to give the whole in the spirit of sincere and voluntary devotion, he cunningly secretes a part. The doom which awaits him, however, is not inflicted merely as the punishment of his avarice, nor even of the simple falsehood, but for the gratuitous hypocrisy and sanctimonious pretension which Christ himself had so earnestly and repeatedly denounced, and which, in this instance, was attempting to make its way over the threshold of his infant church. By the immediate inspiration of God, the Apostle detects the guilt of Ananias, and pronounces his doom. "Was not the land thine own," said St. Peter to him, "and after it was sold, was it not in thine own power? Thou hast lied not unto men, but unto God! And Ananias, hearing these words, fell down, and gave up the ghost." There is not in the whole round of Raffaelle's works any thing more strikingly just, appropriate, and energetic, whether in relation to action, character, or expression, than his representation of this event. Were we unacquainted with the subject, it would be impossible to mistake its general meaning. The authoritative attitude of St. Peter, his stern expression, the extended arm and uplifted finger, convey at once the impression that he is



[The Death of Ananias.]

giving utterance to some terrible denunciation; while the Apostles behind, with hands folded, or pointed towards Heaven, acknowledge, with devout astonishment, the manifest interposition of divine justice. The position of Ananias is a wonderful example of Raffaelle's intuitive perception, or of his acute observation of actual fact, or more properly, perhaps, of both. It is evident that the figure has been struck with sudden death; the head has fallen on the shoulders, the eyes have lost their volition, the convulsions which contract the limbs are the spasms of mortal agony; but the fulness and roundness of the muscles show that the blow has fallen on the delinquent while in the full possession of health and vigour. The whole action is consecutive; he has been kneeling at the steps, has fallen backwards, and we perceive, notwithstanding his feeble and unconscious effort to sustain himself on his wrist, that in another moment he will be extended on the floor. So sudden has been the shock, that it has not been perceived except by the persons immediately adjacent to the spot. In these individuals of different sex and ages, the fear and astonishment, naturally excited by such an event, are finely pourtrayed; the young man on the left, recoiling in dismay, affords an effective contrast in the fine extension of his limbs to the foreshortened figure of Ananias. The two men on the right, in the midst of their amazement, appear to admit, by their gestures and expression, the justice of the infliction. It has been questioned whether the woman who is advancing from behind was meant for Sapphira, as it is stated in the sacred record that three hours had elapsed after the death of Ananias before she entered the place. Notwithstanding this objection, it is most probable that Raffaelle intended this figure for the wife of Ananias; and the slight inaccuracy is more than atoned for by the sublime moral, which shows the woman approaching the spot where her husband had met his doom, and where her own death awaits her, but wholly unconscious of those judgments, and absorbed in counting that gold by which both she and her partner had been betrayed to their fate.

We have received several communications on the subject of the Cartoons, of which the following is the substance:—

One correspondent, remarking upon the cartoon entitled "Paul preaching at Athens," affirms that this title "is a misnomer. He was not preaching in our sense of the word, but pleading before a high court of justice. He was not brought before this court, like Socrates, on an actual charge of a breach of the law, but to give an account of his doctrines. The picture therefore fails, as it represents Paul addressing an indiscriminate audience, consisting of philosophers of the different sects then in high esteem, the women not being excluded." Our correspondent then proceeds to lament that in the descriptive account of the cartoon opportunity was not taken to point out an erroneous translation in the common version of the New Testament, which makes Paul speak of his auditors as superstitious; and that his conduct and address were not contrasted with those of Socrates in a somewhat similar situation. He then proceeds as follows:—

"Taking the picture as it is supposed to be, the representation of a fact in a certain place, it has always appeared to me as one of the absurdest productions of modern art, offending without cause both in costume and locality.

"Poets and painters have, as Horace says, a very extensive range allowed to them, but it has its limits. What can be more absurd than to see in the celebrated picture of the Lord's Supper (of which I hope to see a print in your Magazine) our Saviour blessing a modern loaf, a loaf of leavened bread, a species of bread particularly interdicted at that time to be in the house."

A second correspondent states that there are two other productions of Raffaelle, denominated Cartoons, in the Duke of Buccleugh's collection at Boughton House, near Kettering in Northamptonshire. "These cartoons," he says, "are, I believe, very little known; nor have I ever seen any copies or prints of them. They are paintings in water, much of the colouring of which has faded, whilst all the outlines and bolder strokes are remaining. They are on paper, and, from the creases visible in the sheets, appear to have once been folded up for carriage, to be copied, like the other cartoons, in tapestry or upon glass. The subject of one of them is, I think, Ezekiel's Vision; in which the person of the Almighty is wonderfully pourtrayed: it has exactly the same expression as the representations of the same being on the compartments of the ceilings in the Vatican—judging from prints. Of the other I have but little recollection, except that it is a group, and very much in the style of those at Hampton Court—at least according to the copies in the Bodleian—never having seen the originals. The cartoons at Boughton are, I think, somewhat larger than the copies alluded to at Oxford, and are reversed in position, the shortest sides of the parallelograms forming the tops and bottoms." This correspondent wishes to know whether any other particulars are known respecting them, whether any prints or copies are known to exist of them, and by whom they were brought to England. A third correspondent informs us that he has repeatedly inspected these last-mentioned cartoons with great pleasure; and adds that the subject of the second is either the Nativity or the Adoration of the Magi, and that George III. wished to have added them to his collection. We shall endeavour to give a more precise account of these works in a future number.

In the introductory remarks on the Cartoons, in No. 43, deserved praise was given to the engravings of those at Hampton Court by the late Mr. Holloway. But the praise, it appears, should not have been confined to that gentleman, and we readily accede to a request of making known the parties to whom any share is due:

"The fact is," says a correspondent, on whose correctness we can rely, "the engravings have been almost entirely executed by his partners, Messrs. Slann and Webb, who have given up all their time, property, and talents, in executing and supporting the work which must otherwise have long ago sunk from insufficient patronage, and who will even at great pecuniary loss complete the seven engravings. To Mr. Holloway fully belongs the credit of commencing the work, and he, with his eldest nephew, made the beautiful drawings from the originals, and was the public man of the party; but to his partners, who worked unseen and almost unknown, most justly appertains the credit of the engravings."

It appears also that we were in error in stating that the tapestries brought from Spain by Mr. Tupper, and recently exhibited at the Egyptian Hall, had been sold to a foreigner, and by him taken to the Continent. They are yet in the possession of Mr. Tupper's brother.

ON THE ILL EFFECTS OF INSUFFICIENT EXERCISE, CONSTRAINED POSITIONS, AND TIGHT STAYS ON THE HEALTH OF YOUNG WOMEN.

There is no branch of education which stands more in need of revision and improvement than that which relates to the bodily health and growth of children and young persons, and which is now commonly known by the name of *Physical Education*. This is more especially true of the education of girls, particularly such as are brought up at boarding-schools; boys being comparatively but little affected by the causes which act most injuriously on the young persons of the other sex.

The three grand sources of ill-health in female boarding-schools are, 1st, the want of sufficient bodily exercise; 2d, constrained postures; and, 3d, the use of stays; and they originate in the over-anxiety of parents, more particularly mothers, to obtain for their children the three following benefits, or supposed benefits; 1st, a great number of *accomplishments*, as they are termed; 2d, a genteel carriage; and, 3d, a fine shape. Never were objects more completely defeated through injudicious methods of attaining them; the actual results being, too often, in lieu of real substantial benefits, the following lamentable evils: 1st, a smattering of various kinds of knowledge, which are found of little practical utility in the actual business of life, with a great deficiency of those kinds of knowledge which would really be so; 2d, general impairment of the health; 3d, a bad carriage and figure, and, too often, actual deformity of body.

Although these evils are notorious to all who observe what is passing around them in society, and although they have often been the theme of invective in the writings of physicians and philosophic moralists, it cannot be imagined that those most interested in the subject, the fathers and mothers of the rising generation, are in reality aware of their causes, nature, or extent; were they so, they could never be brought to countenance the system in which they originate. It is for this reason, and because it is in a particular manner among the *middle classes* of society that the evils most prevail, that we do not think our pages can be better appropriated than in making them more generally known, and in endeavouring to impress them forcibly on the minds of parents. We are enabled to do this in a very compendious and most authentic form, by means of a few extracts from a valuable work, now in course of publication*, and which, as it is written chiefly for the members of the medical profession, will not be accused of exaggeration or misrepresentation for personal ends. The subjoined quotations are from the article *Physical Education*, written by Dr. Barlow, an eminent physician at Bath, and which has appended to it some important notes by Dr. Forbes, of Chichester, one of the editors.

I. *Of Exercise, or rather of the want of Exercise, in Boarding Schools, and some of its consequences.*

"Boys enjoy exercise freely, and of the best kind, in the unrestrained indulgence of their youthful sports. By means of these every muscle of the frame comes in for its share of active exercise, and free growth, vigour, and health are the result. It would be happy for girls if some portion of such latitude were allowed to them also. But it is far otherwise. Even under the more favourable circumstances of country life, they are too much restricted from the free exercise which health requires. Their very dress unfits them from taking it, and the alleged indecorum of those active movements to which youth and spirits instinctively incite, is a bar to even the attempt being made. At their age the measured, slow-paced, daily walk is quite insufficient even for the muscles specially engaged, while it leaves many others wholly unexercised. If this be true of the more hale and robust inhabitants of the country, how much more forcibly does it apply to the delicate and attenuated residents of towns, and especially to the inmates of female schools. Of these establishments the systems and habits require much revision, and until some effective reformation takes place, of which there is yet but little prospect, they will not fail to excite our sympathy and regret for the blanched aspects, shadowy forms, and sickly constitutions so continually presented, and which it is so painful to witness. Such beings are as little fitted for encountering the toils or fulfilling the duties of life, as are plants of a hothouse for being transferred to the open borders."

* The 'Cyclopædia of Practical Medicine,' published in monthly parts, edited by John Forbes, M.D. F.R.S., A. Tweedie, M.D., and John Conolly, M.D.

To the above passage, the following interesting statement and important remarks are appended in the form of a note by Dr. Forbes, one of the editors:—

"The amount of exercise, or rather the extent to which the *want of exercise* is carried, in many boarding-schools, will appear incredible to those who have not personally investigated the subject. The following is the *carte* of a young ladies' boarding-school, drawn up on the spot, a few years since, from the report of several of its inmates:—

At 6 in the morning the girls are called, and rise.
From 6 to 8, learning or saying lessons *in school.*
8 to 8½, at breakfast.
8½ to 9, preparing lessons *out of school* (*some* of the girls permitted to do so in the garden).
9 to 1, at various tasks, in school.
1 to 1½, out of school, but must not go out of doors; reading or working, and preparing for dinner.
1½ to 2, at dinner.
2 to 5, in school, various tasks.
5 to 5½, at tea.
5½ to 6, preparing to go out; dressing, or reading, or *playing in school.*
6 to 7, walking, generally arm-in-arm, on the high road, many with their books in their hands, and reading.

"Two days in the week they do not walk in the evening at all, being kept in for *dancing;* but, by way of amends, they go out on two other days, from 12 to 1, and then they miss *writing*. It is to be remarked that they *never go out unless the weather is quite fine at the particular hours allotted for walking.* They go to church, all the year round, twice every Sunday, on which day no other exercise is taken.

From 7 to 8, for the older girls, reading or working in school, (this is optional,) and then prayers; for the younger, play in school, and prayers.
At 8, the younger go to bed.
From 8 to 9, the older, reading or working, as before.
9, to bed.

"The twenty-four hours are, therefore, thus disposed of:—

	Hours.
In bed, (the older 9, the younger 10,)	9
In school, at their studies and tasks	9
In school, or in the house, the older at optional studies or work, the younger at play	3½*
At meals	1½
Exercise in the open air	1
	24

"The above account was taken from a second or third-rate school, and applies more particularly to the season most favourable for exercise,—*summer*. It is to be remarked that the confinement is generally greater in these than in schools of a higher order. That the practical results of such an astounding regimen are by no means overdrawn by Dr. Barlow, is sufficiently evinced by the following fact, a fact which we will venture to say may be verified by inspection of thousands of boarding-schools in this country. We lately visited, in a large town, a boarding-school containing forty girls; and we learnt, on close and accurate inquiry, that there was *not one* of the girls who had been at the school two years (and the majority had been as long) that was not more or less *crooked!* Our patient was in this predicament; and we could perceive (what all may perceive who meet that most melancholy of all processions—a boarding-school of young ladies in their walk) that *all* her companions were pallid, sallow, and listless. We can assert, on the same authority of personal observation, and on an extensive scale, that scarcely a single girl (more especially of the middle classes) that has been at a boarding-school for two or three years, returns home

* Younger only two hours and a half.

with unimpaired health; and, for the truth of the assertion, we may appeal to every candid *father* whose daughters have been placed in this situation. Happily, a portion of the ill health produced at school is in many cases only temporary, and vanishes after the return from it. In the schools in which the vacations are frequent or long, much mischief is often warded off by the periodical returns to the ordinary habits of healthful life; and some happy constitutions, unquestionably, bid defiance to all the systematic efforts made to undermine them. No further proof is needed of the enormous evil produced by the present system of school discipline than the fact, well known to all medical men, that the greater proportion of women in the middle and upper ranks of life do not enjoy even a *moderate* share of health; and persons, not of the medical profession, may have sufficient evidence of the truth, by comparing the relative powers of the young men and young women of any family in taking bodily exercise, more particularly in *walking*. The difference is altogether inexplicable on the ground of sex only.

II. *Of the Effects of the Attempts to produce "a good Carriage.'*

"The first error is that of restraining the free motions of the body and limbs, so natural at this period of life, and in which the young of both sexes so much delight. The young lady is now to cultivate manners, to practise a certain demureness supposed to be becoming, to attend to her carriage, keeping her head erect, and her shoulders drawn back; and if from inability to continue the muscular efforts necessary for this end, she fail to do what nature does not empower her to accomplish, negligence or obstinacy is imputed, reproach is cast, which, being felt as unjust, irritates the moral feelings; and thus a slight error in physical discipline becomes a fruitful source not only of bodily injury but of moral depravation. It is a well established fact with respect to muscular energy, that the contractions of muscular fibres on which their actions depend, require intervals of relaxation; that, if the contractions be prolonged without this relief, they in a certain time fail, so that no effort of the will can continue them. In other words, the muscles tire, and an interval of repose is necessary to fit them for renewed effort. This is familiarly instanced by the experiment of holding the arm extended, when, even though no weight be held in the hand, the continued muscular action required for maintaining this position cannot be sustained for many minutes. If this be true of the firm and robust muscles of adults, how much more forcibly does the principle apply to the tender and immature muscles of early life. To preserve a good carriage, to keep the head and shoulders continually in that position which the dancing-master approves, require considerable muscular powers, such as no girl can exercise without long, painful, and injurious training, nor even by this, unless other measures to be hereafter noticed, be resorted to in aid of her direct endeavours. We would not here be understood as undervaluing a good carriage, which is not only pleasing to the eye, but is, when natural, absolutely conducive itself to health, as resulting from that relative position of the several parts connected exteriorly with the chest, which allows greatest freedom to the internal organs. To ensure a good carriage, the only rational way is to give the necessary power, especially in the muscles chiefly concerned; and this is to be done, not by wearying those muscles by continual and unrelieved exertion, but by invigorating the frame generally, and more especially by strengthening the particular muscles through varied exercise alternated with due repose.

"Direct endeavours to enforce what is called a good carriage necessarily fail of their effect, and instead of strengthening they enfeeble the muscular powers necessary for maintaining it. This fact soon becomes perceptible; weakness is noticed, and instead of correcting this by the only rational mode, that of invigorating the weakened muscles, mechanical aid is called in to support them, and laced waistcoats are resorted to. These undoubtedly give support,—nay, they may be so used as almost wholly to supersede the muscular efforts, with the advantage of not tiring, however long or continuously employed. Improvement of carriage is manifested, the child is sensible of relief from a painful exertion, the mother is pleased with the success of her management, and this success appears to superficial observation fully to confirm the judgment which superintends it. In the present ignorance that prevails on all points of animal physiology, it would be quite impossible to convince any mother so impressed that she was doing otherwise than ministering to her child's welfare. Yet what are the consequences to which her measures tend, and which such measures are daily and hourly producing? The muscles of the back and chest, restrained in their natural and healthful exercise by the waiscoats called in to aid them, and more signally in after-life by the tightly laced stays or corsets, become attenuated, and still further enfeebled, until at length they are wholly dependent on the mechanical aid, being quite incapable of dispensing with it for any continuance.

"At first, laced waistcoats are used rather for the convenience of suspending other parts of the dress than with any view of giving support to weak muscles, or of influencing the shape; and confined to such use they would be perfectly harmless. In time, when weakness becomes inferred, not from any evidences of actual debility, but merely from the girls not being able to maintain the unnatural and constrained posture which fashion and false taste enjoin, the advantage of compressing the chest by means of the waistcoast, so as to give support to the muscles of the back, becomes discovered, and the mechanical power supplied by the lace affords but too effective means of accomplishing this compression. The effect pleases the mother, promoting, as it does, her dearly-prized object—a good carriage; it is endured by the girl as the lesser of two evils, for though at first irksome, it releases her from the pain of endeavours which she has not power to continue to the extent required.

III. *Of the Operation and Effects of Stays.*

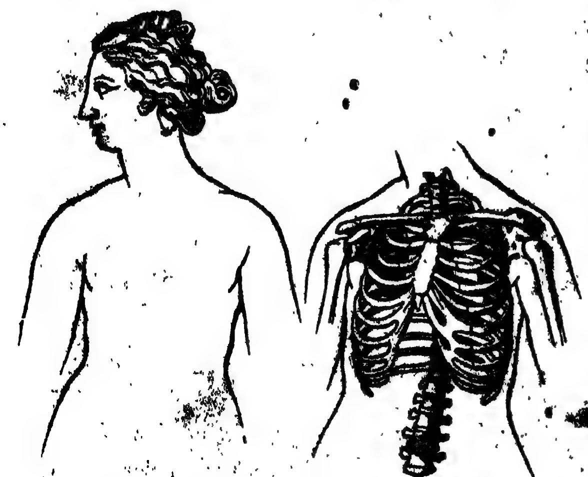
"As years advance, various causes combine to render this practice more inveterate and more pernicious; and still the potent instrument, the lace, lends its ready and effectual aid. Now a taper waist becomes an object of ambition, and the stays are to be laced more closely. This is still done gradually, and, at first, imperceptibly to the parties. The effect, however, though slow, is sure, and the powers of endurance thus exercised come in time to bear almost unconsciously what, if suddenly or quickly attempted, no heroism could possibly sustain.

"The derangements to which this increased pressure gives rise must now be considered. The first is the obvious impediment to the motions of the ribs which this constriction of the chest occasions. For perfect respiration these motions should be free and unrestrained. In proportion as respiration is impeded, is the blood imperfectly vitalised; and in the same ratio are the nutrient and other functions dependent on the blood inadequately performed. Here, then, is one source of debility which affects the whole frame, reducing every part below the standard of healthful vigour. According, also, as each inspiration of air becomes less full, the wants of the system require, as a compensation, increased frequency: and thus quickened respiration commences, disturbing the lungs, and creating in them a tendency to inflammatory action. The heart, too, becomes excited, the pulse

accelerated, and palpitation is in time superadded. All these effects are capable of resulting from mere constriction of the chest; they become fearfully aggravated when, at a more advanced stage, additional sources of irritation arise in flexure of the spine, and in derangements of the stomach, liver, and other organs subservient to digestion. The foregoing disturbances are formidable enough, and sufficiently destructive of health, yet they are not the only lesions (injuries) which tight lacing induces. The pressure, which is chiefly made on the lower part of the chest, and to which this part most readily yields, extends its malign influence to the abdominal viscera also. By it the stomach and liver are compressed, and, in time, partially detruded from the concavity of the diaphragm, to the great disturbance of their functions; and being pressed downwards too, these trespass on that space which the other abdominal viscera require, superinducing still further derangements. Thus, almost every function of the body becomes more or less depraved. Nothing could have prevented the source of all this mischief and misery from being fully detected and universally understood, but the slow and insidious process by which the aberration from sound principle effects its ravages.

"The mere weakness of back, so often adverted to, becomes in its turn an aggravating cause of visceral lesion. The body cannot be always cased in tightly-laced stays; their pressure may be endured to any extent under the excitement of the evening display, but during the day some relaxation must take place. Under it, the muscles of the back, deprived of their accustomed support, and incapable of themselves to sustain the incumbent weight, yield, and the column of the spine bends, at first anteriorily, causing round shoulders and an arched back; but eventually inclines to one or other side, giving rise to the well-known and too frequently occurring state of lateral curvature. This last change most frequently commences in the sitting posture, such females being, through general debility, much disposed to sedentary habits. As soon as lateral curvature commences, the lungs and heart become still more disturbed; anhelation (difficulty of breathing) from slight exertion, short cough, and palpitation ensue; and at this time, chiefly in consequence of the pulmonary derangement, alarm begins to be entertained, and the approach of phthisis apprehended."

The following figures, taken from a valuable work in German, by the late professor *Soemmering, on the Effects of Stays*, cannot fail to make an impression on the mind of every parent and guardian of youth:—



[Fig. 1.] [Fig. 2.]

Fig. 1. is an outline of the famous statue of the Venus de Medici, and may be considered as the *beau ideal* of a fine female figure.

Fig. 2. is the skeleton of a similar figure, with the bones in their natural position.



[Fig. 3.] [Fig. 4.]

Fig. 3. is an outline of the figure of a modern "boarding-school miss," after it has been permanently remodelled by stays.

Fig. 4. is the skeleton belonging to such a figure as No. 3.

We are assured by medical men of the first authority that there is no exaggeration in these outlines. Such melancholy specimens are daily to be met with, both living and dead.

Advantages of high Civilization.—We northern people are so much accustomed to the innumerable conveniences peculiar to a highly civilized state of society, and of which rich and poor all partake, more or less, as of the air they breathe, that we are apt to undervalue or overlook them altogether; and it is well that we now and then should be made to feel the value of what is thus thanklessly enjoyed. We think too little of good and safe roads, lighted streets, public markets, where necessaries and luxuries of all sorts and at all prices are found collected; of cheap and speedy means of conveyance for persons and property; and, above all, that happy division of labour by which the wants of each individual and those of the aggregate mass are supplied with far more ease, in greater abundance, and at infinitely less expense than when each individual is thrown on his own exertions for all he wants, yet has nobody to think on but himself. "It is cheaper to travel in England in a post-chaise, accommodated each night with a good bed and supper, and thanked too by the landlord, than in Sicily on mules, carrying your own beds and cooking utensils, and at the end of each fatiguing day's journey reduced to beg for a night's lodging at the door of a stranger."—*Simond's Travels in Sicily.*

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BIRDS OF PARADISE.



1. *Paradisea apoda.* The Emerald. 2. *Paradisea aurea.* The Siflet. 3. The Incomparable; (Le Vaillant). 4. The Cloudy; (Le Vaillant). 5. *Paradisea superba.* The Superb.

BIRDS OF PARADISE.

MANY of the narratives of the older naturalists are little more than amusing fables. To deduce the leading characteristics of an animal from a minute investigation of its physical construction—to watch its habits with anxious solicitude in its native haunts—formed no part of the care of those who compiled books of natural history a century or two ago. Whatever was imperfectly known was immediately made the subject of a tale of wonder. The old accounts of the Birds of Paradise are striking examples of this disposition to substitute invention for reality. Now and then some traveller brought to Europe the skin of a beautiful race of birds, of whose habits he knew nothing, except what he learnt from the natives who collected them. Their plumage was of the most brilliant lustre; some were covered over the breast and back with tippets of the richest hues; others had long delicate lines of feathers, prolonged from beneath their wings, or branching from the head; and most of these trappings appeared too fragile for any use, and incapable of bearing up against the rude winds which visit the earth. The specimens also which came to Europe were deprived of feet. Fancy had thus ample materials to work upon. These birds, tender as the dove and more brilliant than the peacock, were described as the inhabitants of some region where all was beauty and purity; where no storms ever ruffled their plumage; where they floated about on never-tiring wings in a bright and balmy atmosphere, incapable of resting from their happy flight, and nourished only by the dews and perfumes of a cloudless sky. They were called *Birds of Paradise:* and the few specimens that Europeans saw were supposed to have accidentally visited some sunny spot of our world, rich with flowers and spices, but not their true abiding-place. Such were the tales that the old writers of natural history adopted; and to which even scientific persons appeared to give belief, when they named one of the species, *Paradisea apoda*, the *feetless* Bird of Paradise.

The most correct description of the Birds of Paradise is that given by Gaimard, one of the naturalists who accompanied the French expedition of discovery under Captain Freycinet, in 1817. He observed many of these birds in the island of Vaigiou, one of the islands forming the group of which New Guinea is the principal. They constitute a genus of the order of *Omnivores* (eating all things). Their principal food is fruit and insects; and the strength of their beaks and feet admirably fit them for sustaining themselves in the thick woods where they dwell. They delight in the most inaccessible parts of forests; and when the weather is serene, they perch themselves on the topmost branches of the highest trees. They fly with great rapidity, although they constantly direct their course against the wind. This is a proceeding which they are compelled to adopt, in consequence of the luxurious trappings with which nature has clothed them; for the wind, pressing in the direction of their long feathers, holds them close to their bodies: in a contrary direction their plumage would be ruffled, and their loaded wings would act with difficulty. They, however, seldom venture from their retreats in rough weather. At the approach of a storm they entirely disappear, instinctively dreading the hurricane, which they would be unable to meet, and before which it would be equally dangerous to fly. They are extremely courageous, ready to attack any bird of prey that excites their alarm. They have never been seen in a state of domesticity amongst any of the Papou tribes, inhabiting the islands where they are commonly found. Of their nests, their mode of hatching, and their care of their young, nothing appears to be known.

In the wood-cut at the head of this article we have grouped together some of the more splendid of the Birds of Paradise, as given by Le Vaillant, in his work on Birds. The species, No. 1, (*Par. apoda,*) is very remarkable for the beauty of its plumage, which is of the most varied and brilliant colours. It is especially distinguished by the long curved fillets which spring from beneath its wings, and extend in length about two feet. No. 2 (Le Sifilet) is so called from the six fillets which adorn its head. No. 3 and 4 are drawn and described by Le Vaillant. The latter is represented displaying its splendid plumes as the peacock does his tail. No. 5 (the Superb) exhibits pretty clearly the nature of the plumage of the Birds of Paradise. The sort of tippet upon its breast, and the fan-like ornaments of its shoulders, have no connection either with the wings or the tail. The bird has the power of raising or depressing them; but they do not appear to assist its flight. Those on the shoulders fold down over a part of the wings like a mantle. In dimensions the various species differ considerably. The bodies of most are not larger than that of a thrush, although the thickness of their plumage makes them appear the size of a large pigeon.

One of the most beautiful of the Birds of Paradise is called the king-bird, (*Paradisea regia*). Of this species many curious stories are current in the islands where these birds are found. The natives aver, for example, that the two principal species of Paradise birds have each their leader, whose imperial mandates are received with submissive obedience by a numerous train of subjects; and that his majesty always flies above the flock to issue his orders for inspecting and tasting the springs of water where they may drink with safety—the Indians being in the practice of taking whole flocks of birds by poisoning the water where they resort to drink. Le Vaillant considers that this notion originated from the casual observation of a strange species amongst a gregarious flock. This explanation accords with the account given by M. Sonnerat of the manners of the king-bird of Paradise; for being a solitary bird, going from bush to bush in search of the berries upon which it feeds, it may occasionally be seen near the flocks of those which are gregarious, where its singular plumage must render it conspicuous.

These gorgeous trappings of the various species of the Birds of Paradise excite the cupidity of man. The feathered skins form a large object of commerce between the people of the New Guinea islands and the Malays. The natives entrap the birds or shoot them with blunt arrows; and they prepare the skins with considerable nicety, having removed the true wings, which are not so brilliant as the other feathers, and cut off the feet and legs. The absence of feet in all the specimens brought to Europe, gave rise to the fable that the Birds of Paradise had no power of alighting, and were always on the wing. Their migratory habits may probably also have given some colour to this tale. At the nutmeg season they come in flights from the southern isles to India; and Tavernier says, "The strength of the nutmeg so intoxicates them that they fall dead drunk to the earth:"

> "Those golden birds that, in the spice time, drop
> About the gardens, drunk with that sweet food
> Whose scent hath lur'd them o'er the summer flood."
>
> MOORE.

Influence of Domestic Habits.—The man who lives in the midst of domestic relations will have many opportunities of conferring pleasure, minute in detail, yet not trivial in the amount, without interfering with the purposes of general benevolence. Nay, by kindling his sensibility, and harmonising his soul, they may be expected, if he is endowed with a liberal and manly spirit, to render him more prompt in the service of strangers and the public.—*Godwin's Preface to St. Leon.*

COUNCILS OF TRADE.

An excellent institution exists in all the great manufacturing towns of France, which, with some few modifications to suit the difference of circumstances, might be adopted with advantage in the manufacturing towns of other countries. This establishment consists of local tribunals charged with the discussion and settlement of all questions connected with the manufacturing interests of each particular district. An institution of this kind formerly existed in France under the title of the "Maitre Garde." This manufacturing tribunal was revived and re-modelled by a decree of Napoleon in 1806, and is now known by the name of "Conseil des Prud'hommes." In the evidence given by Dr. Bowring on the Silk Trade, the Conseil des Prud'hommes at Lyons is more particularly described. The following brief notice of this tribunal is here given with the hope of making it better known; as we believe that an institution of such a nature, with some few alterations, might lead to a permanent improvement in the morals and happiness of the inhabitants of our manufacturing towns.

This society at Lyons is composed of nine silk manufacturers and eight silk weavers. The representatives of the manufacturers have always been elected by the whole body of master manufacturers, but until lately a more exclusive system was practised with regard to the election of the weavers. Those weavers only were eligible to vote who had paid the patent duty; their number, amounting to sixty, formed only a small proportion of the whole body of working weavers, and it resulted in consequence that as these latter were not truly represented, their interests were not properly considered, so that injustice and mismanagement sometimes occurred.

After the events which took place at Lyons in November 1831, this great grievance under which the weavers laboured was remedied, and the institution was reorganized. Accordingly, at the beginning of last year, the right of voting was much enlarged, and extended to all weavers who possess four looms or more of their own. This number is at present seven hundred and seventy-eight, and the number of looms belonging to them collectively is three thousand four hundred and thirty-five looms. This body of men is represented by the eight weavers in the "Conseil des Prud'hommes," which is thus composed of workmen and masters; the president always being a manufacturer.

The business of this association is to conciliate and watch over the interests of all parties. Any disputes about wages are settled by their authority; all questions between masters and men, and masters and apprentices, and, in short, every thing which can in any way bear upon the question of the silk manufacture is referred to them. They are invested by Government with a certain defined power: in some cases they have the privilege of inflicting fines, and are allowed to punish by imprisonment to the extent of three days; a discipline which is repeatedly applied to refractory apprentices. They have also the power of summoning witnesses and compelling their attendance. This tribunal sits in open court; its discussions are an object of great interest, and its decisions give general satisfaction. It acts as a *court of conciliation*. Dr. Bowring states, that he was much struck with the general good sense of the proceedings in this court. The men who represent the weavers appeared to be men of sound discretion and sober judgment, and the whole is well organized and extremely popular.

Such an association, established in every manufacturing town, and formed of manufacturers and artisans chosen in equal numbers, and from the whole body of their respective classes, would do much towards promoting and continuing cordial good-will between masters and workmen. Such regulations and arrangements might be framed by their representatives as would best conduce to their mutual interest, and they would discover that unity of purpose, while it created a kindly sympathy between the two parties, is one means of guarding against fluctuations in trade, and of insuring prosperity to both the artisan and the manufacturer.

ON THE PRONUNCIATION OF HARD WORDS.

[Continued from No. 54.]

Another class of hard words in which our language abounds is those terms of art and science which are compounded of Latin and Greek words, especially the latter. These are now exceedingly numerous, and so frequently and so unavoidably used, that it is a matter of *necessity* to understand them, and of great *use* to pronounce them aright.

The *meaning* of these words is often understood simply because the *thing* and the *name* are at the same time presented to us. We see or learn from experience the properties of the *thing*, and we therefore attach definite ideas to the *name* by which it is signified. Most people know very well what is meant by a *telescope*, a *kaleidoscope*, a *microscope*, and many other words ending in *scope*. But when a new name arises such as *stethescope*, belonging to some art or science which is practised only by few, the *thing* is, to the generality of people, unseen and unknown; and consequently the *name* conveys no idea with it. This is a great disadvantage in the present state of our language, that when a new *name* is introduced, which is compounded of two or more words, the *name* does not convey *in itself*, to an English reader, any description of what the thing is. This happens because the parts of which such words are composed are really Greek words, and therefore cannot be generally understood. If, instead of *telescope, kaleidoscope, microscope, stethescope*, we were to say a *long-seer*, a *pretty-seer*, a *small-seer*, a *breast-seer*, these names themselves would convey some idea; but unfortunately we have so long abandoned this mode of making new words, that we believe it impossible ever again to use the materials of our language for such a purpose. The Germans have in this a great advantage over us, as a very large number of their scientific terms are formed of words already existing in the language, and familiar even to the poorest labourer. Thus, instead of *geography, osteology, metallurgy, chronology, architecture*, they can say, *earth-description, bone-knowledge, smelting-art, time-reckoning, building-art*; though they have also other words for many of these terms of art, which are the same as ours with some slight difference in orthography, such as *geographie, chronologie*, &c. Notwithstanding the number of hard words by which all our sciences are fenced in, just as if the intention had been to bar up the road and the approaches to knowledge, we believe that it is practicable to make them all more intelligible to the least educated people, who possess common sense and a little industry, than they are at present to nine-tenths of those who so readily use these words, and only pretend to know their meaning.

The recognised pronunciation of the vowels and consonants in such words as we have just alluded to, is, with few exceptions, the same as in real Greek words. Yet there are *some* exceptions: for instance, we pronounce *arch* in *archbishop*, in the same way as when the word signifies a curved piece of building, such as *bridge* or *gateway*. In other cases where the word *arch* precedes a vowel, it should be pronounced like *ark*, as in *architrave, architecture*. The pronunciation of c and g follows the rules already given; but when *g* precedes *y*, as in *gymnasium, gymnastics, gypsum*, and perhaps some few more instances, there is no absolutely fixed rule, though there ought to be: some people pronounce the *g* like *j* in *judge*, others like *g* in *gone*. The latter is undoubtedly preferable. *Ch* at the beginning of all words derived from Greek, and, indeed, in any other

part of a word, should be pronounced like *k*, as in *chemistry*, *chondropterygii*, *acronychally*, &c.

The syllable on which the main stress should be put, otherwise called the accented syllable, is pretty well determined in all words of common use, such as *ther-mo'meter*, *baro'meter*, *astro'nomy*, *geo'graphy*, *geo'logy*, *te'lescope*, *che'mistry*; and from these and other similar instances a useful rule may be deduced, which is this—in words of three or more syllables (and perhaps this comprehends far the greatest number of instances), the accent should be placed on the third syllable from the last. According to this rule the word *orycte'ropus*, the scientific name for the *Aard-vark* (see Pen. Cy. p. 1), should be pronounced as we have marked it, with the accent on the last syllable but two, which is technically called the *antepenultima*. There are, however, exceptions to this rule, as *a'dama'ntine* (which has two accents), *a'eroli'te* (a word of four syllables), which has the chief accent on the first syllable, and also one on the last. This word *a'-e-ro-li'te* reminds us that we ought to remark, that when *a* and *e* are not united in one syllable, they should be pronounced perfectly distinct, as in the example given, and in *a-e'-ri-al*, *a'-e-ro-nau't*. *Achroma'tic*, a word signifying "without colour," *diploma'tic*, *pragma'tic*, and some other words of this class are pronounced as we have marked them.

We have still something more to say about *orycte'ropus*. Many scientific terms have been formed by persons, who were only imperfectly acquainted with the Greek language, from which these terms are principally taken, and consequently they have not always been formed according to analogy, *i. e.* the makers of these new words have not in all cases attended to the same general principle on which all words of *one kind* should be constructed. In addition to this, the *pronunciation* of many of these words, with respect to the accented syllable, is not *always* quite the same among the persons who profess the science to which it belongs: it is not *always* the same among people of the same country or nation; and nothing is so common as for the people of one nation, such as the English or French, to follow a different practice from those of another nation, such as the German or Italian. There is, therefore, in some cases, though perhaps they are not very numerous, no established practice which all people will acknowledge to be right. But more than this: a person well acquainted with the Greek language will often assert that many terms of art are wrongly pronounced by those acquainted with the art. He will assert, for instance, that *orycte'ropus* should be pronounced *ory'cteropu's*; and he will be right according to the analogy of the *Greek* language. But *usage*, we think, ought to decide which mode of pronunciation ought to be adopted, and usage will undoubtedly be in favour of *orycte'ropus*.

KENILWORTH CASTLE.



[Remains of Kenilworth Castle.]

Kenilworth, or as it has been sometimes written, Killingworth Castle, in Warwickshire, about midway between the towns of Warwick and Coventry, and within five miles of each, is one of the most magnificent ruins in England. The town of Kenilworth appears to have had its castle even in the Saxon times; but no part of the present building was erected till after the beginning of the twelfth century, in the reign of Henry I. Its founder was Geffrey de Clinton, said to have been a person of humble origin, originally from Clinton in Oxfordshire. He raised himself, however, to importance by the superiority of his talents; and after having held the office of Lord Chamberlain and Treasurer, he was finally elevated to that of Lord Chief Justice of England. In 1165, however, in the reign of Henry II., the castle seems to have come into the hands of the crown; but, soon after the accession of King John, it was restored to Henry de Clinton, the grandson of the founder. When or how it again became the property of the crown does not appear; but in 1254 possession of it was granted for life, by Henry III., to Simon de Montfort, who had that year married his sister Eleanor, the Countess Dowager of Pembroke, and whom he soon after created Earl of Leicester. This bold and aspiring nobleman, having some time after headed an insurrection of the barons, was, after the temporary success of that enterprise, slain at the great battle fought near Evesham in Worcestershire, on the 4th of August, 1265; the royal troops being commanded by Prince Edward, afterwards Edward I. In the following year the Castle of Kenilworth maintained against the victorious prince one of the most obstinate defences recorded in our history. Although Simon de Montfort, the late earl's son, had already surrendered himself, a body of his father's followers, who held possession of the castle, still continued to bid defiance to the royal authority. They seem to have been a band of men of the most determined and desperate character. While they occupied Kenilworth they were the terror and scourge of the neighbourhood for many miles around, the parties whom they sent out to forage in all directions doing their work of plunder and destruction with a recklessness and ferocity unpre-

cedented even in that barbarous age. Prince Edward and his army sat down before the castle on the 25th of June. Before this a herald whom the King had despatched to summon the garrison to surrender, had been sent back with his hand cut off. The besiegers immediately commenced the assault of the fortress; but they were met with a resistance so vigorous as to render their utmost efforts unavailing. The place was well stored with provisions; and the tradition is, that various formidable engines of war were for the first time brought into use on this occasion, by means of which the besieged were enabled to hurl enormous stones with the most destructive force against their assailants. Some of these stones are still pointed out lying in the neighbourhood of the ruins. The Prince then determined to turn the siege into a blockade. Various overtures were made to the garrison; and on the 24th of August a parliament was assembled in the camp, which promulgated an act for the general pardon of the rebels on certain specified and very lenient conditions. Even this declaration, however, known by the name of the *Dictùm de Kenilworth*, produced no effect. But famine and disease at last compelled them to capitulate about the beginning of November. By this time they had been forced to eat their horses, and every man of them was reduced almost to the paleness and ghastliness of a corpse.

Henry, upon thus obtaining possession of Kenilworth, bestowed it upon his second son, Edmund Earl of Derby, to which title was soon after added that of Earl of Leicester and Lancaster. Here, in 1279, in the reign of Edward I., was held a grand tournament, known by the name of *the Round Table*, from the manner in which the guests who attended the festival were placed, in order to prevent all disputes as to precedence. A hundred ladies were present; and as many knights, many of them foreigners, displayed their skill and prowess against each other with horse and lance.

On the attainder and execution of Thomas Earl of Lancaster, son of Edmund, in 1322, his castle of Kenilworth again reverted to the crown. When the weak and unhappy Edward II. fell into the hands of his insurgent barons, (headed by his infamous queen and Henry of Lancaster, the brother of the late Earl Thomas,) he was conveyed to this strong-hold, and detained in close imprisonment for several months. Here he went through the ceremony of formally resigning the crown to his son. Kenilworth now returned to the family of Lancaster, which also obtained the superior title of Duke; and it remained in their hands till it fell to John of Gaunt, by his marriage with Blanch, the daughter and heiress of Duke Henry, commonly called the *Good Duke*, the son of the Henry mentioned above. His son Henry IV. brought it once more back to the crown, from which it was not again separated till Elizabeth, soon after her accession, conferred it upon her favourite Robert Dudley, the celebrated Earl of Leicester. On his death, in 1588, it passed to his brother the Earl of Warwick, and shortly after to Sir Robert Dudley, Leicester's son by the Lady Douglas Sheffield, to whom it has been generally believed that he was married, though he never would acknowledge her as his wife. On Dudley persisting in remaining abroad without a licence, his manor of Kenilworth was confiscated to the crown in the commencement of the following reign, and bestowed by James upon his eldest son, the lamented Prince Henry. At this time, according to a survey which was made of it, the ground within the walls was found to consist of seven acres. The castle itself is described as built all of hewn freestone, the walls being from four to fifteen feet in thickness. The circuit of the entire manor was not less than nineteen or twenty miles, within which were included nearly eight hundred acres of woods, "the like," say the surveyors, "both for strength, state, and pleasure, not being within the realm of England."

The magnificent pile had in fact been reared by the labours of four centuries, almost every proprietor into whose hands it passed having added something to its extent, beauty, and grandeur. John of Gaunt, in particular, and Dudley Earl of Leicester, had spared no expense to make it, what it was acknowledged eventually to be, the noblest mansion in England. Dugdale states that the sum expended on the building by the latter did not fall short of £60,000. At the commencement of the civil wars Kenilworth was in all its glory. But it was also on the eve of its destruction. On the ascendancy of the republicans, Cromwell bestowed the property upon some of his officers, who demolished the castle, and sold such of its materials as could be removed for what they would bring. For many years after this, its bare and crumbling walls were left exposed to the depredations of all who chose to make a quarry of them, till the place was reduced to the state in which it now is.

Still, as we have said, the ruin is an extensive and magnificent one. Mr. Britton, in his Architectural Antiquities, has given a ground-plan of the building, from which a good idea may be formed of what it was in its prouder days. Every thing essential to it, either as a residence or a fortress, seems to have been contained within the ample sweep of its encompassing battlements. Its south, east, and west sides were surrounded by a broad belt of water, which could also be carried round the north. Out-jutting towers of defence guarded it at every point. The interior comprehended two ample courts, named the upper and the lower ward, a large garden and a tilt-yard, surrounded with splendid galleries for the accommodation of the spectators. At the end farthest removed from the chief buildings stood the stables; near them was the water tower; and not far off, another erection, probably used as the prison of the castle. The inhabited part consisted of various suites of apartments, many of which seem to have been of the most superb description. The great hall, which was built by John of Gaunt, and the walls of which are still standing, was of the dimensions of eighty-six feet in length by forty-five in width.

The appearance of Kenilworth in its present dilapidated state is picturesque in the extreme. Much of it is covered and overhung with ivy and other clinging shrubs, intermixing their evergreen beauty with the venerable tints of the mouldering stonework. The noble moat, or lake, as it might more properly be called, in the midst of which it once stood, and which in former times used to be stored with fish and fowl, is now almost dried up. But, besides the hall already mentioned, vast portions of the pile are still standing in the same dismantled state. The walls of the hall are perforated by a series of lofty windows on each side; and spacious fire-places have been formed at both the ends. Another remarkable part of the ruin is a tall dark-coloured tower, near the centre, supposed to have been built by Geffrey de Clinton, and to be the only portion now existing of his castle. Like many of the old fortresses, both in this country and on the continent, it has obtained the designation of Cæsar's Tower, probably from the fancy that it was erected by that conqueror. One of the gate-houses, the work of the Earl of Leicester, is also still tolerably entire. The different ruins are still known by the names of Lancaster's and Leicester's buildings, in memory of their founders. One portion is called King Henry's apartments, being that in which it is said King Henry VIII. was wont to lodge.

But the brightest era in the history of Kenilworth was in the reign of Elizabeth. The old fame of Leicester's splendid festivities has been lately revived among us by the graphic pen of Scott, whose rich fancy has also peopled the desolation of this fine ruin with some of its most vivid creations, although in this instance at the expense, it must be allowed, of no slight deviation from historic truth. But the hospitalities of Kenilworth had been celebrated long ago both in prose and verse.

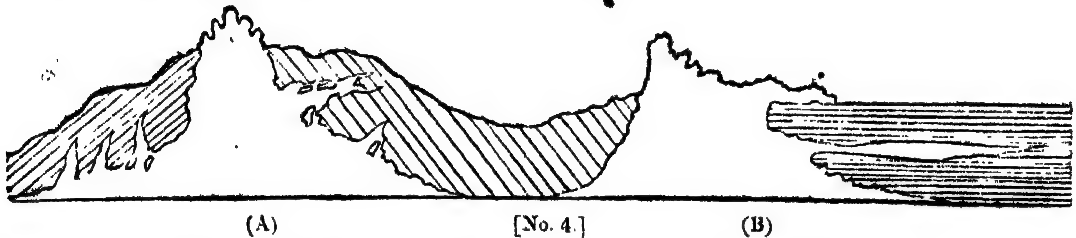
Queen Elizabeth thrice visited Leicester after he had taken possession of this princely domain, first in 1565, again in 1572, and for the third time in 1575. It was on this last occasion, when the royal visit lasted for seventeen days, that the entertainments were most remarkable for their cost and gorgeousness. A long and minute account of them was soon after published by a person of the name of Laneham, who was in attendance on her Majesty; and George Gascoigne, the poet, who wrote a mask that was acted on the occasion, also sent his production to the press. Both works are to be found in the first volume of Mr. Nichols's Progresses and Public Processions of Queen Elizabeth, published in 3 vols. 4to. in 1823.

MINERAL KINGDOM.—SECTION 4.

We have shown that the crust of the globe is composed of two great classes of rocks, one of which consists of a series of beds of stone of different kinds, lying upon one another in a certain determinate order of succession, called the *Stratified Rocks* or the *Strata;* the other of a class of stones distinguishable from the strata by peculiar mineral composition, by never containing pebbles or the remains of animals and plants, and by never being arranged in parallel layers, and from which last character they have been denominated the *Unstratified Rocks.* We shall now proceed to show in what manner these two classes of rocks are associated together. It is quite evident that the mode of formation of the two must have been totally different. While the strata, by their parallel arrangement, the pebbles of pre-existing rocks, and remains of living bodies which they contain, demonstrate that they must have been formed under water, by deposition *from* the surface downwards, the whole characters of the unstratified rocks equally prove that they must have come to the surface from the interior of the earth, *after* the deposition of the strata; that is, that they have been ejected among the strata from below in a melted condition, either fluid or in a soft yielding state. Geologists have come to this conclusion, from a careful examination and comparison of the unstratified rocks with the products of existing volcanoes, or those burning mountains that have thrown out streams of melted stone or lava, both in past ages, as recorded in history, and in our own time. By this comparison they have discovered a great similarity, often an identity, of composition between the unstratified rocks and lava, and the closest analogy in the phenomena exhibited by the masses of both kinds, and in their relations to the stratified rocks with which they come in contact.

In every case the unstratified rocks lie under the stratified. This order has never been reversed, except in cases which have been afterwards discovered to be deceptive appearances, and where they have been protruded between strata, as will be afterwards mentioned. But it may be said that this fact of inferiority of position is no proof of ejection from below, far less of posteriority of formation, for they might have been the foundation on which the strata are deposited; their eruption from the interior, and that that eruption took place after the strata were formed, are proved by other evidence, as we shall presently show.

A section of the crust of the earth, where the stratified and unstratified rocks have been found associated together, has often exhibited the appearance represented by the diagram No. 4.



(A) [No. 4.] (B)

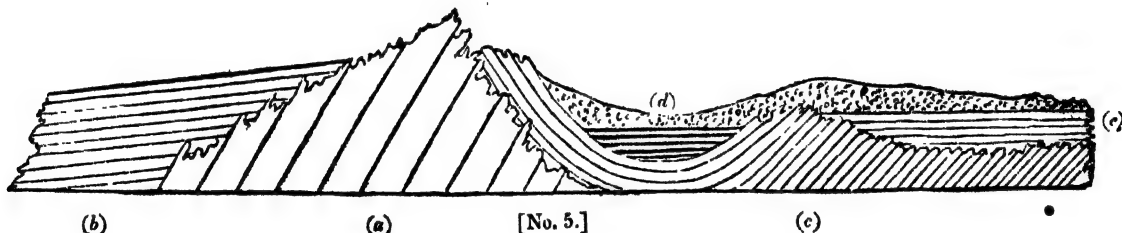
A and B are mountains of granite or of whinstone, with strata of limestone lying upon it. From A branches or shoots connected with the principal mass are seen to penetrate into the superincumbent strata, and in the mountain B the granite overlies the limestone for a considerable way near the top, as if it had flowed over at that place, and lower down it has forced its way between two strata, ending like a wedge. Now as the penetrating substance must necessarily be of subsequent formation to the body that it penetrates, it is evident that the granite must have been formed after the limestone, although the latter rests upon it. But if any doubt remained, it would be removed by the additional fact that the granite veins in the mountain A contain angular fragments of limestone, identical with the strata above, and the fractured ends are seen to fit the places of the continuous stratum from which they have been broken off.

The posteriority of the formation of the unstratified rocks to the strata is thus made evident from their relative positions; their forcible ejection from below is equally proved by the penetration of their veins or shoots into the superincumbent strata in an upward direction, often with the most slender ramifications to a great distance, and by the portions broken from the strata and enveloped in the substance of the vein. That they were ejected in a soft melted state, produced by the action of heat, is shown by the close resemblance in mineral composition of the unstratified rocks to the products of existing volcanoes, and by remarkable changes often observed to have taken place in the strata where they come in contact with granite and whinstone. Soft chalk is converted into a hard crystalline limestone like statuary marble; clay and sandstone are changed into a substance as hard and compact as flint, and coal is turned into *coke;* all of them changes which are analogous to what takes place when the substances are subjected to a strong artificial heat under great pressure. In the case of coal it is very remarkable; for when a bed of that substance, and a stratum of clay lying next it, come in contact with whinstone, the tar of the coal is often driven into the clay, and the coal loses all property of giving flame, although, at a distance from the whinstone, it is of a rich caking quality.

We have shown that we are enabled to fix a chronological order of succession of the strata with a considerable degree of precision, and although we have not the same accurate means of determining the relative ages of the unstratified rocks, there are yet very decisive proofs that certain classes of them are older than others, that different members of the same class have been ejected at distinct periods, and that the same substances have been thrown up at different times far distant from each other. Granite, in veins, has never been seen to penetrate beyond the lower strata; but whinstone and the lavas of existing volcanoes protrude in masses, and send out veins through all the strata: veins of one sort of granite traverse masses of another kind, and whinstone and basalt veins are not only found crossing masses and other veins of similar rocks, but even of granite. Upon the principle, therefore, before stated, that the penetrating substance must necessarily have been formed subsequently to the body penetrated, the above phenomena demonstrate successive formations or eruptions of the unstratified rocks.

As the highly elevated, broken and contorted positions of the strata are only explicable on the supposition of a powerful force acting upon them from below, and as they are seen so elevated and contorted in the neighbourhood of the unstratified rocks, it is a very legitimate inference that the mountain chains and other inequalities on the earth's surface have been occasioned by the horizontally deposited strata having been heaved up by the eruption of these rocks, although they may not always appear, but be only occasionally protruded to the surface, through the rents produced by the eruptive force. The phenomena of earthquakes are connected with the same internal action, and these have often been accompanied by permanent elevations of entire portions of a country. This theory of the elevation of mountains by a force acting from the interior of the earth is not a mere inference from appearances presented by rocks, but is supported by numerous events which have occurred repeatedly within the period of history down to our own time. In the middle of a gulf in the island of Santorino, in the Grecian Archipelago, an island rose from the sea 144 years before the Christian era; in 1427 it was raised in height and increased in dimensions; in 1573 another island arose in the same gulf, and in 1707 a third. These islands are composed of hard rock, and in that last formed there are beds of limestone and of other rocks containing shells. In the year 1822, Chili was visited by a violent earthquake which raised the whole line of coast for the distance of above one hundred miles to the height of three or four feet above its former level. Valparaiso is situated about the middle of the tract thus permanently elevated. A portion of Cutch, near the mouth of the Indus, underwent a similar revolution in the year 1819, when a district, nearly sixty miles in length by sixteen in breadth, was raised by an earthquake about ten feet above its original level. A volcanic eruption burst out in an adjoining part of India at Bhooi at the exact period when the shocks of this earthquake terminated. These cases must not be confounded with the production of new mountains, such as that of Jorullo in Mexico in the year 1759, which was raised to the height of 1600 feet above the table land of Malpais by eruptions of scoriæ and the outpouring of lava. The appearance of a new island off the coast of Sicily in the year 1831 is another phenomenon of the latter class. It rose from a part of the sea which was known by soundings a few years before to have been 600 feet deep, to the height of 107 feet above the water, and formed a circumference of nearly two-thirds of a mile. It was composed of loose cinders, and the part that rose above the level of the sea was washed away in the winter of the same year, but an extensive shoal remains.

It must not be supposed that these internal movements only took place after the whole series of strata, represented in diagram No. 1*, had been deposited. There must have been long intervals between the termination of the deposition of one member of the series and the commencement of that of the stratum immediately above it; and internal movements accompanied with disturbance of the already deposited strata, after they had come to consolidate into stone, appear to have taken place during the whole period that the strata, from the lowest to the uppermost in the series, were deposited. The clearest evidence of this is afforded by certain appearances exhibited by the strata in all parts of the globe that have yet been examined. The diagram, No. 5, represents a case of very common occurence, and will explain our meaning: it must be borne in mind that it is an acknowledged principle in geology that all stratified rocks, in whatever position they are now found, must have been originally deposited horizontally.



[No. 5.]

There are here five different series of strata, *a*, *b*, *c*, *d*, *e*. Now, it is evident, that the series *a* must have been first disturbed; that, after its change of position, the series *b* and *c* were deposited, covering *the ends* of the strata of the series *a*. But *c* appears to have been acted upon by two forces at distant points, when thrown out of its horizontal position, for the strata dip in opposite directions, forming a basin-shaped cavity, in which the series *d* was deposited. In like manner, after the disturbance of *c*, the series *e* was deposited, covering the ends of *c*; but the internal force which raised the beds *e* from the depths of the sea to the summit of the mountain where they are now seen, appears to have acted in such a direction as to have carried up the whole mass without disturbing the original horizontality of the structure. It is obvious that all the interior strata must have partaken of this last disturbance. There are, besides, numerous proofs that there have been not only frequent elevations of the strata, but also depressions; that the same strata which had been at one time raised above the surface of the sea had again sunk down, preserving an inclined position; that they had formed the ground upon which new sediment was deposited, and had again been raised up, carrying along them the more recently formed strata.

In our next section we shall proceed to point out certain great divisions in the series of stratified rocks, which are founded upon the chronological order of superposition, which we have described in this and the preceding sections.

LORD SOMERS.

The 4th of March has been sometimes stated to be the birth-day of Lord Somers; but neither the day on which he was born, nor even the year, is known with certainty.* It rather appears that the latter was 1650, although some accounts make it to have been 1652. The father of this distinguished lawyer and statesman was an attorney, residing in the town of Worcester. Here his son John, the subject of our present notice, was born. He was remarked from his earliest years for a sobriety and steadiness of disposition, which even prevented him from joining much in the sports of those of his own age; but both at school and at the university he distinguished himself rather by his studiousness than by the brilliancy of his talents. He was entered as a Gentleman Commoner of Trinity College, Oxford, in 1674, and was called to the bar by the Society of the Middle Temple in 1676. He did not, however, commence the exercise of his profession till some years after this; remaining at Oxford till 1681, when his father died, and left him a small property. Meanwhile he had been most industriously storing his mind both with legal and general knowledge, and had even appeared as a writer, by taking part in a translation of Plutarch's

* See Penny Magazine, No. 51, page 21.

Lives, and another, in verse, of Ovid's Epistles, which were published by Tonson. Some Tracts, on points of Constitutional Law, also proceeded from his pen about this time, which attracted much notice. Having removed to London in 1682, and soon after begun to practise at the bar, he rapidly rose to professional distinction. In the great trial of the Seven Bishops, which took place in the Court of King's Bench on the 29th of June, 1688, Somers was engaged as one of the counsel for the defendants. His appearance on this occasion brought him conspicuously before the nation, both as one of the ablest lawyers of the day, and one of the most formidable champions of the popular party in the state. It is understood, indeed, that he was already one of the confidential advisers of the Prince of Orange. Accordingly, at the close of this year, when the Prince, after his landing, summoned the Convention, Somers was chosen as a representative to that assembly by his native town of Worcester. He took a leading part in the discussions which followed, and especially distinguished himself in the conference between the Lords and Commons, on the famous resolution of the latter, that the King, James II., had abdicated the government, and that the throne was thereby become vacant. He also acted as chairman of the second of the two committees appointed to arrange the securities of the new settlement, on whose report was founded the Declaration of Right; and is probably, therefore, to be considered as one of the chief among "those, whose penetrating style," as Burke has strikingly expressed it, "has engraved in our ordinances, and in our hearts, the words and spirit of that immortal law." Soon after the accomplishment of the Revolution he was made Solicitor-General, and knighted. On the 2d of May, 1692, he exchanged this office for that of Attorney-General; and on the 23d of March, in the following year, he was elevated to the dignity of Lord Keeper of the Great Seal. He presided in the Court of Chancery under this title till the 22d of April, 1697, when he was appointed Lord High Chancellor, and raised to the peerage as Baron Somers of Evesham. The King also bestowed upon him at the same time a grant of the manors of Reygate and Howleigh in Surrey, worth about £600 per annum, together with an annuity in money of £2,100. The place which he now occupied was no higher than that to which the most competent judges, and indeed the public generally, had long regarded him as both destined and entitled. "Though he had made a regular progress," says Addison, ('Freeholder,' No. 39,) "through the several honours of the long-robe, he was always looked upon as one who deserved a superior station, till he arrived at the highest dignity to which these studies could advance him."

In the parliament, however, which met in December, 1698, the party to which Lord Somers had been all his life opposed, appeared in great and unusual strength. It was not long before they began to direct the most violent and persevering attacks against the Chancellor. Of their charges, we can only afford room to state, that they now seem to be considered, by historians of all shades of opinion, as entirely without foundation. At the time, however, they served the purpose of their authors too well. After various other proceedings, on the 10th of April, 1700, an address was moved in the House of Commons for the dismissal of the Chancellor. It was negatived; but King William, alarmed by the pertinacity of the enemies of his able and honest minister, and actuated by the hope that by that sacrifice the clamours of the faction might be appeased, a few days after asked Lord Somers to make a voluntary surrender of the seals. His lordship did not think that it became him thus to assist by his own act those who wished to accomplish his degradation, and he respectfully refused to comply with the royal request. The King then sent an express demand for the seals, when they were instantly delivered.

But even the dismissal of Lord Somers did not put an end to the persecution of which he was the object. On the 14th of April, 1701, the House of Commons sent up articles of impeachment against him to the Lords. When the day for the trial came, however, nobody appeared to support the charges; and his lordship was of course acquitted. He now retired altogether for some time from public affairs, devoting himself to those literary and scientific pursuits which in his busiest days he had never entirely neglected. He had always indeed shown himself in the days of his power a zealous patron of literature. Among the eminent persons whom his encouragement contributed to bring into notice may be mentioned the celebrated Mr. Addison, who dedicated to him one of his early poems, and also, in 1702, his Travels in Italy, in a very flattering address. The first volume of the Spectator is likewise dedicated to Lord Somers. In 1702 his lordship was elected President of the Royal Society, of which he had long been a member.

He afterwards returned to public life; and in 1706 introduced a very important bill, for removing certain defects in the practice of the courts of law. He has also the credit of having been the chief projector of the union with Scotland, and he certainly took an active part in the promotion of that measure. He was also again in place, as President of the Council, from 1708 to 1710; and even after his second dismissal from office, in the latter year, continued for some time to be an active and powerful debater in the House of Lords. His health, however, at length began rapidly to decline, and although he appeared at the Council Board after the accession of George I., both his body and mind were by that time so much enfeebled as to incapacitate him from taking any share in business. At last, on the 26th of April, 1716, a stroke of apoplexy terminated his sufferings in death. Lord Somers never was married, and his estates went to the descendants of a sister.



[Portrait of Lord Somers.]

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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HOTEL DE VILLE, OR TOWN-HOUSE OF BRUSSELS.



[Hotel de Ville of Brussels.]

Having in a former number given a brief description of the capital of Belgium, we shall now speak more particularly of the Town-house of Brussels, or Hotel de Ville, as it is called in the French language. When we read of the noble public edifices that adorn so many towns in the Low Countries, and the numerous useful works that have been executed to favour commerce and promote the general welfare, we are naturally led to inquire into the history of a people, who, though living on a very limited territory, have held a most important rank in Europe for many centuries.

We find that before England had become the seat of manufacturing industry, and long before she had improved her internal communication by good roads and canals, the industrious people of the Low Countries had acquired both these important instruments of wealth:

and though living in the midst of the remains of feudal tyranny, the towns had obtained privileges which their masters could not often venture to trample on, and the spirit of a democratic constitution tempered and controlled the sovereignty of the monarch and the nobles. The description* which we are about to give of this building, and of its uses, applies to a period before the first French Revolution, while the old magistracy of the town still existed, and Brussels belonged to the house of Austria.

The Grand Place (by an oversight called the Place Royal in the former article on Brussels), called also the great market, is an oblong square. Its chief ornament is the Hotel de Ville, or Town-hall, a Gothic building of a square form, and the handsomest structure of the kind in the Low Countries. This edifice was commenced in 1400, and finished in 1442. The tower, which is of a pyramidal form, does not stand precisely in the centre of the building. Its height is 364 feet, and its summit is crowned with a gilded statue of St. Michael trampling a dragon under his feet. The statue itself is 17 feet high, and as it turns with the wind serves the purpose of a weathercock. Like all the rest of the edifice this tower is built of a very durable blue-coloured stone.

The principal door is immediately under the tower, and an open piazza, which runs the whole length of the front, is formed by columns, which support a terrace of the same depth as the piazza itself. This terrace is ornamented with a stone-sculptured balustrade, loaded with ornaments. On the right side of the piazza is a staircase, by which we enter the rooms of the building, and this is properly the real entrance. The front has forty windows, and between each is a niche, designed to receive statues of the sovereigns and celebrated men of Brabant. The roof is slated, and pierced with about eighty small windows, which have pointed tops or coverings, and gilded ornaments. On the entablature of the wall a balustrade rises breast high, and serves as the finish. The top of the roof is covered with lead, and variously ornamented. On passing through the principal door we come to an oblong square, or court; the buildings which form it were erected after the bombardment of 1695, when the French, under Marshal Villeroi, destroyed fourteen churches, and several thousand houses. This court contains two fountains, each adorned with a statue of white marble, representing a river-god reclining in the midst of reeds, and resting one arm on an urn. All the rooms of the edifice are capacious and elevated, and each was appropriated to some particular purpose. That in which the states of Brabant met, together with its appendages, is in the part constructed after the bombardment of 1695, and merits a particular notice. It is connected with four other apartments, one of which used to be occupied by the officers of the states; there was also the registry room near it, and several other apartments of small size. The great room is reached by a gallery, containing six portraits of dukes of Brabant by C. Grangé. In three of the chambers are tapestries, which were made from the designs of Le Brun, and have reference to the history of Clovis. The ceiling of the second was painted by V. H. Janssens, and is an allegorical representation of the three estates of Brabant —the clergy, nobility, and the tiers état; which last consisted of the towns of Louvain, Brussels, and Antwerp. Over the chimney is a picture representing Godfrey III., called the bearded, in his cradle, which is hung from a tree in the midst of his army. The sight of the cradle animated his soldiers to such a degree, that after three days' fighting they gained a decisive victory over the confederate princes of Grimberghe and Malines. Over the chimney in the third room are the portraits of Maximilian of Austria and Maria of Burgundy. The fourth room, that in which the states assembled, and which was called the states'-chamber, is highly ornamented: over the chimney is a portrait of a Prince of Lorrain, painted by Lips. The canopy and its adjuncts were of crimson velvet, ornamented with gold fringe. Under the canopy is a standing portrait of Joseph II., painted by Herreyhs of Antwerp. The ceiling, which was painted by Janssens, represents the assembly of the gods: the cornice is enriched with gilded sculpture. Between the windows are painted the three chief towns, Louvain, Brussels, and Antwerp. All the part of the wall opposite the window is furnished with beautiful tapestries—one representing the inauguration of Charles VI., another the abdication of Charles V., and the third the inauguration of Philip the Good. These tapestries were executed by L. Legniers, after the designs of Janssens. On each side of the throne are two mirrors, under each of which is a table, made of a composition to imitate marble*, and on this composition the topographical maps of Brabant are cut with the greatest accuracy. The great table which was placed in the middle of the room was 12 feet wide and 40 long, and covered with velvet, which was ornamented with a deep fringe of gold, and hung down on the floor.

The Hotel de Ville of Brussels enjoyed a large income, arising from the duties levied on provisions, drinkables, and the rents of permanent property, such as our corporations possess. The magistracy of the town had at its head a functionary called *Amman* (*amtmann* in German, i. e. office-man), who, with his lieutenant, secretaries, registrars of the town and the treasury, were for life. The other officers of the town were changeable yearly, but could be continued at the pleasure of the sovereign. The amman, being the first of the officers who composed the municipal body of Brussels, was, with his lieutenant, named by the sovereign; and it was required that he, as well as his lieutenant, should be natives of Brabant, of noble birth, and born in wedlock.

The burgomaster, the seven échevins (sheriffs), the two treasurers, and the superintendent of the Rivage†, were named by the sovereign out of seven patrician families, and, as we have said, could be continued in office as long as the sovereign wished. The newly-chosen *magistrates* elected from among the burgesses, who composed the *nations*, a burgomaster, nine counsellors, two receivers of the town, and the receiver of the Rivage, who composed the large council. These men were the receivers, not the treasurers of the town, and had the management of all the town money: they received, payed, and finally accounted before the magistrates, the large council, and the deans of the nations. These *nations* represented the body of the Brussels burgesses, and were nine in number, each nation forming a body containing several trades. Each trade had its deans, and its own separate council, composed of the old deans; and each *nation* also had its council, composed in like manner of old deans; and every nation had the name of some male or female saint. When the monarch made any demand, the nine nations joined the large council and the town magistrates, to deliberate if the demand should be granted or refused. The magistrates of the town had one vote, and the large council and each of the nations one, which in all made eleven. If the majority was in favour of the demand, it was granted; if against, it was finally rejected. The nations assembled at the Hotel de Ville at the sound of a bell, called the bell of the nations.

To be made a citizen (burgess) of Brussels a person applied to the town magistrates, and on the payment of a certain sum was admitted as a citizen. But if a man wished to carry on a trade, or some particular mecha-

* Description de Bruxelles, 1743. Do. 1782.

* Deux trumeaux de très fines glaces.—*Description de Bruxelles* 1743. Some say jasper.

† A part of Brussels containing the corn-quay, the turf-quay, and other places, to receive the commodities brought by the canals or other communications.

nical business, it was not enough to be made a citizen: it was necessary to be admitted also into the *community* of the business or art which he wished to follow. Some professions however were open, such as that of banker and agent. The Hotel de Ville then, it appears from this statement, served, among other purposes, as a place of deliberation for the representatives of the city of Brussels, whenever any business of great importance called them together. The complicated form of government which formerly prevailed in these old cities may be imagined from the little that we have stated about it; and the system of privileges and restrictions as to the free exercise of trade, whatever advantages it may have had at first (for such things sometimes have their rise in a really useful principle, though more frequently they have rested on erroneous notions), must have ultimately proved detrimental to these cities. The history of Aix-la-Chapelle, with the factions and feuds of the contending interests, is one of the most curious and instructive that we can refer to.

AFAR IN THE DESERT.

Afar in the desert I love to ride,
With the silent bush-boy alone by my side,
When the sorrows of life the soul o'ercast,
And, sick of the present, I turn to the past;
When the eye is suffused with regretful tears
From the fond recollections of former years,
And shadows of things that have long since fled
Flit over the brain, like ghosts of the dead:—
Bright visions of glory that vanished too soon,—
Day-dreams that departed ere manhood's noon,—
Attachments by fate or by falsehood reft,—
Companions of early days lost or left;
And my native land—whose magical name
Thrills to the heart like electric flame,—
The home of my childhood,—the haunts of my prime,—
All the passions and scenes of that rapturous time
When the feelings were young, and the world was new,
Like the fresh bowers of Eden unfolding to view;—
All—all now forsaken, forgotten, foregone!
And I—a lone exile remembered of none—
My high aims abandoned,—my good acts undone,—
Aweary of all that is under the sun,—
With that sadness of heart which no stranger may scan,
I fly to the desert afar from man!

Afar in the desert I love to ride,
With the silent bush-boy alone by my side,
When the ways of the world oppress the heart,
And I'm tired of its vanity, vileness, and art;
When the wild turmoil of this wearisome life,
With its scenes of oppression, corruption, and strife,—
The proud man's frown, and the base man's fear,—
The scorner's laugh, and the sufferer's tear,—
And malice, and meanness, and falsehood, and folly,
Dispose me to musing and dark melancholy;
When my bosom is full, and my thoughts are high,
And my soul is sick with the bondman's sigh—
Oh! then there is freedom, and joy, and pride,
Afar in the desert alone to ride!
There is rapture to vault on the champing steed,
And to bound away with the eagle's speed,
With the death-fraught firelock in my hand—
The only law of the desert land!

Afar in the desert I love to ride,
With the silent bush-boy alone by my side;
Away—away from the dwellings of men,
By the wild-deer's haunt, by the buffalo's glen,
By valleys remote where the oribi plays,
Where the gnu, the gazelle, and the hartèbeest graze,
And the gemsbok and eland unhunted recline
By the skirts of grey forests o'erhung with wild-vine,
Where the elephant browses at peace in his wood,
And the river-horse gambols unscared in the flood,
And the mighty rhinoceros wallows at will
In the v'ley* where the wild-ass is drinking his fill.

Afar in the desert I love to ride,
With the silent bush-boy alone by my side,
O'er the brown Karroo, where the bleating cry
Of the springbok's fawn sounds plaintively;
Where the zebra wantonly tosses his mane
As he scours with his troop o'er the desolate plain;
And the timorous quagha's whistling neigh
Is heard by the fountain at fall of day;
And the fleet-footed ostrich over the waste
Speeds like a horseman who travels in haste,
Hying away to the home of her rest
Where she and her mate have scooped their nest,
Far hid from the pitiless plunderer's view
In the pathless depths of the parched Karroo.

Afar in the desert I love to ride,
With the silent bush-boy alone by my side;
Away—away—in the wilderness vast,
Where the white man's foot hath never passed,
And the quivered Coranna or Bechuan
Hath rarely crossed with his roving clan:
A region of emptiness, howling and drear,
Which man hath abandoned from famine and fear;
Where grass, nor herb, nor shrub takes root,
Save poisonous thorns that pierce the foot;
And the bitter-melon, for food and drink,
Is the pilgrim's fare by the salt-lake's brink:
A region of drought, where no river glides,
Nor rippling brook with osiered sides;
Where reedy pool, nor palm-girt fountain,
Nor shady tree, nor cloud-capt mountain,
Is found, to refresh the aching eye:
But the barren earth, and the burning sky,
And the blank horizon, round and round,
Without a break—without a bound,
Spread—void of living sight or sound.

And here, while the night-winds round me sigh,
And the stars burn bright in the midnight sky,
As I sit apart by the desert stone,
Like Elijah at Horeb's cave alone,
"A still small voice" comes through the wild—
Like a father consoling his fretful child—
Which banishes bitterness, wrath, and fear,—
Saying—"MAN IS DISTANT, BUT GOD IS NEAR!"

* *V'ley*, or *valei*, a lake or marsh.

*** The above poem was written about ten years ago at the Cape of Good Hope. It first appeared in the 'South African Journal' for April 1824; and has been since reprinted, sometimes very inaccurately, in several collections of fugitive poetry. The present copy has been revised by the author (Mr. T. Pringle) for this publication.

SIMPLIFICATIONS OF ARITHMETICAL RULES.

No. 4.

Previously to showing the way of finding how much a given sum per year will yield per day, we will make one remark on the use to be made of the remainder in division. When the remainder is to be thrown away, if it be as great as half the divisor, the last figure of the quotient should be increased by 1. Thus 97 divided by 11, which gives the quotient 8 and the remainder 9, or $8\frac{9}{11}$, should rather be written 9 than 8, when the fraction is to be thrown away.

Again, division by 20 is the same as division by 2, if the quotient be removed one place more to the right than would be the case in division by 2. Thus,

```
20)1573
   ----
     78 rem. 13
  or 79 rejecting the fraction.
```

To find how much a given sum, say £2739. 19*s*. $8\frac{3}{4}$*d*. per year, will yield per day, first convert this sum as in No. 1, retaining only the first figure found from the shillings, or annexing a cipher if there be less than two shillings, which gives 27399. Divide first by *four*, then by *eleven*, then by *twenty*, repeating the successive divisions by *eleven* and *twenty*, until there is no longer any quotient, and attending to the above remark in disposing of the remainder. Add all the quotients as follows:—

```
          4)27399
           ------
      { 11) 6850*
Add   { 20)  623
      { 11)   31
      {        3
           ------
            7507
```

* This ought to be 6849, with a remainder 3. Throw away the 3, and increase the quotient by 1, which gives 6850.

Cut off the three last places 507, which convert into shillings, pence, and farthings, as in No. 1, and let all the remaining places be pounds. This gives £7. 10*s*. 1¾*d*., which is within one farthing of the truth.

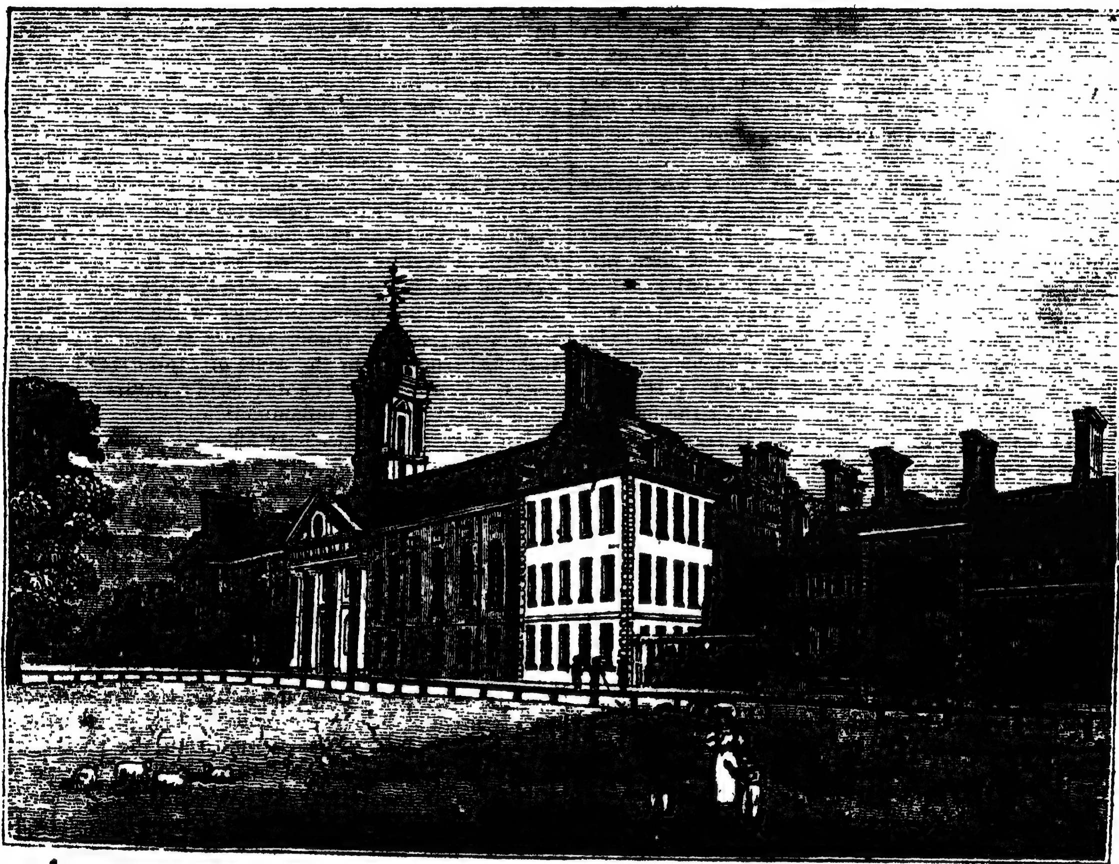
Suppose it required to find how much sixty millions of pounds sterling gives per day. Annexing a cipher by the rule, dividing by 4, &c. we have

	4)	600000000
Add	11)	150000000
	20)	13636364
	11)	681818
	20)	61983
	11)	3099
	20)	282
	11)	14
		1
		164383561

which gives £164,383. 11*s*. 2¾*d*., within a farthing of the truth. In such a case as this, where the pounds only are of consequence, we might have neglected the three columns on the right, which would have saved two divisions and shortened the rest. We should have begun, in that case, by striking off two ciphers instead of annexing one.

A near guess, sufficient for most purposes, may be obtained in the following way. The number of pence per day is very nearly two thirds of the number of pounds per year. Hence subtract one-third of the pounds from the pounds, and let the result be pence. This result is too great by about a farthing for every eighteen pence in it, and too little by a farthing for every eight shillings rejected in taking the pounds. For example, £100 gives above two thirds of 100*d*. per day, or about 67*d*., or 5*s*. 7*d*. This contains eighteen pence about three times, so that 5*s*. 6½*d*. is nearer the truth, which is about 5*s*. 5¾*d*.

CHELSEA HOSPITAL.



[North Front of Chelsea Hospital.]

The opposite banks of the noble river which flows through the British metropolis, could not be more fitly adorned than they are by those two great monuments of the public beneficence, the Hospitals of Greenwich and Chelsea. Both these retreats are splendid places; the former, especially, is one of the most magnificent palaces in the country; and yet their inmates are, for the most part, merely private soldiers and sailors. It may be said that they are, after all, but the abodes of persons of poor and low degree, and that there is an unsuitableness in giving those a palace to dwell in, whose mode of life in other respects is about on a level with that of the inhabitants of cottages. Thus might those argue who looked to the matter with a reference only to physical considerations, and could not, or would not, view it in its moral bearings. But we should not, we confess, be satisfied to see the institutions founded by the bounty of the nation for the shelter of its veteran defenders, consist merely of so many ranges of hovels. The economy, we apprehend, would neither be appropriate nor profitable. Every time one of our gallant seamen now casts his eye upon Greenwich, every time he has the gorgeous pile before him in fancy, it is an inspiration to him of the same character with that which is derived from the anticipation of public honours in any other profession in which they may be gained. He feels proudly that in his old age he will not be accounted a burthen by his country, but that he shall receive from her, and be held worthy of, something more than mere bread.

Chelsea Hospital is a very inferior structure to that of Greenwich as a display of architectural beauty; but it

is at least a convenient and neat building, and altogether, with its airy and spacious courts and walks, far from being destitute of imposing effect. The design is said to have been Sir Christopher Wren's. It consists of three courts, two of which are complete quadrangles, while the central one is open on the side next the river. In the part of the building which fronts this opening are a large hall on the one side and a chapel on the other, both of which contain some pictures, though none of any great merit. The chapel is 110 feet in length by 30 in width, and the hall is of the same dimensions. The only other large apartments in the building are some of those forming the lodgings of the governor, which are at the extremity of the eastern wing of the principal court. In the centre of the court stands a bronze statue of Charles II., in a Roman dress.

The wards of the pensioners are sixteen in number, each being 200 feet in length and 12 in breadth, and containing twenty-six beds. They occupy the greater portion of the two wings of the principal court, each of which is 365 feet in length. The officers have small separate apartments. The other two courts contain an infirmary, furnished with hot and cold baths, and apartments for the treasurer, chaplain, apothecary, and other functionaries. The regular number of in-pensioners is four hundred and seventy-six, of whom twenty-six are captains, thirty-two serjeants, thirty-two corporals, and the rest privates. But the institution also supports some thousands of out-pensioners.

The ground on which Chelsea Hospital now stands was formerly occupied by a college, founded in 1609 by Dr. Matthew Sutcliffe, Dean of Exeter, for a somewhat singular purpose. It was ordained to consist of a provost and nineteen fellows, all to be in holy orders except two, whose business it should be to wage a constant war of the pen with Roman Catholics, Arminians, Pelagians, and other heretics. James I., who took a keen interest in the scheme, granted it a charter in 1610, in which it is declared that it should go under the name of King James's College at Chelsea. It seems also to have been called the Controversy College. This institution had the honour of enrolling among its members Camden, who was nominated its historian, Sir Henry Spelman, Antonius de Dominis the celebrated Archbishop of Spalatro, and many learned divines; but it never arrived at any prosperity. The subscriptions which were solicited for its support could not be obtained; and, although the founder left it a considerable amount of property at his death, in 1629, it was found that only a small part even of this bequest could be recovered. Buildings, however, of considerable extent had been erected. Soon after the restoration the property appears to have been estreated to the crown, which indeed had frequently before this assumed the power of making use of the place for purposes of its own. For some time it was used as a receptacle for foreign prisoners. At length, in 1669, Charles II. granted it to the newly incorporated Royal Society. They retained possession of it till 1682, when they sold it back to the King for £1,300. The old buildings were immediately thrown down, and on the 12th of May, in the same year, the first stone of the present fabric was laid by Charles himself, attended by a great number of the principal nobility and gentry. The crown, however, was not at the whole expense of the erection. Large contributions to the work were made by several public-spirited individuals. Sir Stephen Fox, the ancestor of the present noble family of that name, gave no less a sum than £13,000. According to tradition the person who first suggested the project was the notorious Nell Gwyn. She, according to the common story, is said to have prevailed upon the King to undertake the work, her compassion for the destitute situation of the disbanded veterans of the army having been strongly excited by one of them coming up one day to the door of her coach, and soliciting charity, with a piteous tale of the wounds he had received in the royal cause. The edifice was not completed till the year 1690, in the reign of William and Mary. For a fuller account of this hospital the reader may consult Lysons's Environs of London, and Faulkner's History of Chelsea.

ON THE NATURE OF CONSUMPTION AND OTHER DISEASES OF THE CHEST.

In a preceding number of the Magazine we gave a short description of the structure and use of the human lungs; and we shall now make a few observations on the principal diseases to which they are liable,—namely, catarrh, pleurisy, inflammation of the lungs, and consumption.

The first three are all of the nature of ordinary inflammation, but as they have their seats in different parts of the lungs or their immediate connexions, medical men have assigned to them different names. That the reader may have an idea of the source of these distinctions, he must be informed that the pulmonary organs have been divided by anatomists into three distinct textures, which may be individually or collectively the seat of disease. In the first place, branches of the windpipe perforate the lungs in every direction, and these as well as the windpipe are lined throughout by a delicate membrane similar to the lining of the mouth and nostrils; inflammation of this membrane constitutes *catarrh* or *common cold*. Secondly, the outside of each lung is covered by a still more delicate membrane, thin and transparent like "silver" paper, called the pleura; inflammation of this membrane constitutes *pleurisy*. Thirdly, there is a texture contained between the internal and external membranes just described, which consists of the vessels and other proper substance of the lungs; inflammation of this intervening texture is what is known in technical language by the name of *inflammation of the lungs*. *Consumption* is a disease of a nature quite apart from that of ordinary inflammation.

No class of diseases have afforded, under certain circumstances, more difficulty in their discrimination than those of the chest. The various inflammatory attacks when they existed in a severe degree, have been at times confounded with each other; and the protracted effects of inflammation in the living body, are still frequently mistaken by the public for the presence of consumption. A patient may have violent cough, frequent expectoration of purulent matter, shortness of breath, sense of pain or oppression in the chest, wasting of the flesh, hectic fever, and yet all these symptoms may be the consequence of an extensive and long continued attack of catarrh; or this (and it less rarely occurs) with the effects of a dangerous pleurisy, or of inflammation of the proper substance of the lungs. The difficulty experienced in attempting to discriminate these diseases is explained in the fact that they have many symptoms in common. Every severe derangement of the lungs and their connexions is sure to be accompanied with cough, shortness of breath, and one or more of the other symptoms enumerated above. The difficulty of discrimination is further accounted for in the peculiar *position* of the lungs. As the lungs are contained within a bony case formed by the ribs, we are unable, when any portion of their structure is changed by disease, to ascertain either by our sight or our touch the exact character and seat of the morbid change, and, if we have no other means of forming an opinion, we are obliged to depend on the external symptoms, which may, as has been previously observed, occasionally deceive us.

Until the year 1816, indeed, no better way had been discovered of discriminating pulmonary diseases; but at this period, Dr. Lœnnec, an eminent physician of Paris, hit upon a new method. It consisted in applying *the ear* to the purposes of discrimination and the originality

and strangeness of the discovery excited great surprise and no little incredulity amongst the profession of the day. Dr. Lœnnec was led to enter on this new path by a very simple circumstance. By bringing his ear near to the chest of a patient, he observed that certain sounds were emitted from the chest during the act of breathing. Following up the hint, he constructed an instrument on the principle of an ear-trumpet that the sounds might be heard the more distinctly, and with this instrument, called a stethoscope, he commenced a series of observations. These observations, after having been prosecuted with astonishing assiduity for several years, ended in Lœnnec's giving publicity to the fruits of his labours. Their general result showed that the lungs when in a healthy state always emit during respiration sounds of a peculiar character; and in the progress of their diseases that they emit sounds of a different description, each disease, singular to say, having its own variety of sounds. This, the acoustic mode of discrimination, has since had an extended trial, and its claims to utility are now recognised by professional men in various parts of the world.

The inflammatory diseases of the chest are as curable as inflammation in other parts of the body; but the consumptive disease is one of the most intractable with which we are acquainted. Conscientious medical men at once admit that patients in whom consumption has been established very rarely recover; yet there are quacks who pretend to be able to cure every instance, and, what is still more to be regretted, such persons have often succeeded in bringing over a portion of the public to believe in their pretensions. It is not difficult, however, to account for this apparent success. An affectionate mother for instance, who has delicate female children, is exceedingly apt, should any of them become subject to cough to take alarm, and to immediately conclude that the cough is a sign of the commencement of consumption. If, while under this impression, the mother obtains the opinion of a quack, she is certain to have her suspicions corroborated. The child is then submitted to his treatment, and though the complaint be a common cold or any other complaint equally curable, he will publish the case, as soon as recovery comes about, as a cure of consumption, and the mother who was at first deceived by her own affectionate solicitude, and afterwards duped by the cunning of the impostor, will voluntarily attest his certificate of skill. This is a fair sample of the manner in which quackery secures its advocates and its victims. On the list of the honourable practitioner we never find these "surprising cures." No, when he is consulted in such cases, he assures the mother that her impressions are groundless, prescribes for the patient, and, when the affection is removed, the only credit *he* claims or receives is the credit of having subdued a catarrh, or other result of common inflammatory action.

Although the nicest judgment of the scientific physician be occasionally required to discriminate consumption in the living body, from the chronic effects of pectoral inflammation, there is no difficulty in their discrimination when we come to examine the contents of the chest after death. In an examination of a consumptive patient after death, the lungs are found in a state which cannot be produced by any other known disease. Were the public in possession of any rational conception of this state, it would effectually shield them from the designs of those unprincipled persons who pretend to have a specific for its removal. In the language of medicine the lungs of consumptive patients are said to contain *tubercles* or *small tumors*, and we shall presently lay before the reader a sketch of the progress of these extraordinary and destructive bodies.

The seeds of the disease, which will eventually establish consumption, may be deposited in his lungs a considerable time before the patient is aware of any alteration in his general health. He may be engaged for weeks in the routine of business or of pleasure, previous to his receiving any warning of the pulmonary danger, unless, perhaps, in a trifling irritation about the top of the windpipe, accompanied by a dry tickling cough. A sight of the lungs, during this early stage, can be obtained only in case the patient be destroyed by the inroad of some other disease, or by an accident. Then, on opening the chest, the following appearances present themselves.

In the upper half of both lungs, great numbers of roundish bodies, somewhat resembling small pearls, are seen scattered. They are of a pale grey colour, and vary in size from that of a millet to that of a hempseed. They feel hard, and adhere to the substance of the lungs, in which they are set after the manner of currants in the surface of a pudding. These are the remarkable bodies called tubercles. Their structure is altogether foreign to the healthy structure of the lungs; but the functional or organic change of the latter, which must necessarily precede their formation, is not as yet clearly explained. In the obscurity of their origin, they resemble certain plants that suddenly spring up in places where their species were previously unknown. It is certain, however, that the elements of tubercles are not derived from the atmosphere, for they are often found in parts of the human frame, such as the bones, to which the atmospheric air cannot gain admission.

This early stage, we have remarked, may or may not be attended with slight external symptoms. The tubercles are too small and too slow in their growth to disturb as yet, in any marked degree, the vital functions of the surrounding parts. The substance of the lungs quietly yields to their pressure, and the respiration is not sensibly affected by their morbid encroachment. But, once created, tubercles will, in a longer or shorter time, proceed through their accustomed course. Their progress may be conveniently divided into three stages, of which two stages remain to be described.

In the first stage, the tubercles had attained the size of millet and of hempseeds. In the second stage, they continue to increase in size, and, drawing nearer to each other, they appear arranged into irregular groups. A yellow speck soon becomes developed in the centre of each tubercle, and, extending it slowly, encroaches on the grey structure, of which the tubercle seemed originally composed, until the grey colour completely disappears in the yellow. Individually the size of the tumours may now be included between that of a pea and a filbert. Their structure is still firm, and several may be seen either coalescing or united into one mass.

The third stage is at hand. The groups of tubercles are united into homogenous masses, generally equal in size, or rather larger than a walnut. The structure of each mass becomes gradually softer and moister, and if pressed between the fingers at this time, it feels greasy like new cheese. Continuing to soften, it gradually passes from the solid to the fluid state. The fluid first forms in the centre of the mass, and its quantity steadily augments until the solid portions of the tubercles are completely broken down. In a short time, these fluid tubercles burst into the air tubes, and are expectorated in a violent fit of coughing, leaving hollow ulcers in the substance of the lungs.

This is the history of genuine consumption, on the tubercular disease of which more than a fourth of the inhabitants of Great Britain are said to perish. Commencing, as we have seen, in small hard grains, the tubercles gradually increase in size, and change their colour from grey to yellow. They then unite into irregular masses. The centres of these masses become soft, and afterwards fluid. The fluidity eventually involves the whole mass, and this is the final transformation which tubercles undergo before they burst into the

air tubes and are expectorated. The constitution of the patient generally begins to suffer in the second stage. In the third stage the symptoms are still more severe. Harassing cough has then set in, and fever, with copious night-sweats, &c. A temporary relief may succeed to the expectoration of the first fluid tubercles; but new crops will continue to form and go through the same process, until the lungs of the patient are no longer capable of sustaining life, and his body is reduced to almost the figure of a skeleton.

As we have not space at present, we shall perhaps make some remarks hereafter on the medical treatment suitable to consumption.

TASSO.

On the 11th of March, 1544, was born at Sorrento, near Naples, Torquato Tasso, the great author of the Gerusalemme Liberata (Jerusalem Delivered). His father was Bernardo Tasso, also a scholar and a poet, in his own day of considerable repute. The life of Tasso was almost from its commencement a troubled romance. His infancy was distinguished by extraordinary precocity; but he was yet a mere child when political events induced his father to leave Naples, and, separating himself from his family, to take up his abode at Rome. Hither Torquato, when he was only in his eleventh year, was called upon to follow him, and to bid adieu both to what had been hitherto his home, and to the only parent whom it might almost be said he had ever known. The feelings of the young poet expressed themselves upon this occasion in some lines of great tenderness and beauty, which have been thus translated:—

> " Forth from a mother's fostering breast
> Fate plucks me in my helpless years:
> With sighs I look back on her tears
> Bathing the lips her kisses prest;
> Alas! her pure and ardent prayers
> The fugitive breeze now idly bears:
> No longer breathe we face to face,
> Gathered in knot-like close embrace;
> Like young Ascanius or Camill', my feet
> Unstable seek a wandering sire's retreat."

He never again saw his mother; she died about eighteen months after he had left her. The only near relation he now had remaining besides his father was a sister; and from her also he was separated, those with whom she resided after her mother's death at Naples preventing her from going to share, as she wished to do, the exile of her father and brother. But after the two latter had been together for about two years at Rome, circumstances occurred which again divided them. Bernardo found it necessary to consult his safety by retiring from that city, on which he proceeded himself to Urbino, and sent his son to Bergamo, in the north of Italy. The favourable reception, however, which the former found at the court of the Duke of Urbino, induced him in a few months to send for Torquato; and when he arrived, the graces and accomplishments of the boy so pleased the Duke, that he appointed him the companion of his own son in his studies. They remained at the court of Urbino for two years, when, in 1559, the changing fortunes of Bernardo drew them from thence to Venice. This unsettled life, however, had never interrupted the youthful studies of Tasso; and after they had resided for some time at Venice, his father sent him to the University of Padua, in the intention that he should prepare himself for the profession of the law. But all views of this kind were soon abandoned by the young poet. Instead of perusing Justinian he spent his time in writing verses; and the result was the publication of his poem of Rinaldo before he had completed his eighteenth year. We cannot here trace minutely the remaining progress of his shifting and agitated history. His literary industry in the midst of almost ceaseless distractions of all kinds was most extraordinary. His great poem, the Jerusalem Delivered, is said to have been begun in his nineteenth year, when he was at Bologna. In 1565 he first visited the court of Ferrara, having been carried thither by the Cardinal Luigi d'Este, the brother of the reigning duke Alphonso. This event gave a colour to the whole of Tasso's future existence. It has been supposed that the young poet allowed himself to form an attachment to the princess Leonora, one of the two sisters of the Duke, and that the object of his aspiring love was not insensible to that union of eminent personal graces with the fascinations of genius which courted her regard. But there hangs a mystery over the story which has never been completely cleared away. What is certain is, that, with the exception of a visit which he paid to Paris in 1571, in the train of the Cardinal Luigi, Tasso continued to reside at Ferrara, till the completion and publication of his celebrated epic in 1575. He had already given to the world his beautiful pastoral drama the Aminta, the next best known and most esteemed of his productions.

From this period his life becomes a long course of storm and darkness, rarely relieved even by a fitful gleam of light. For several years the great poet, whose fame was already spread over Europe, seems to have wandered from city to city in his native country, in a state almost of beggary, impelled by a restlessness of spirit which no change of scene would relieve. But Ferrara was still the central spot around which his affections hovered, and to which, apparently in spite of himself, he constantly after a brief interval returned. In this state of mind much of his conduct was probably extravagant enough; but it is hardly to be believed that he really gave any cause for the harsh, and, if unmerited, most atrocious measure to which his former patron and friend, the Duke Alphonso, resorted in 1579, of consigning him as a lunatic to the Hospital of St. Anne. In this receptacle of wretchedness the poet was confined for above seven years. The princess Leonora, who has been supposed to have been the innocent cause of his detention, died in 1581; but neither this event, nor the solicitations of several of his most powerful friends and admirers, could prevail upon Alphonso to grant Tasso his liberty. Meanwhile the alleged lunatic occupied, and no doubt lightened, many of his hours by the exercise of his pen. His compositions were numerous, both in prose and verse, and many of them found their way to the press. At last, in July, 1586, on the earnest application of Don Vincenzo Gonzaga, son of the Duke of Mantua, he was released from his long imprisonment. He spent the close of that year at Mantua; but he then resumed his wandering habits, and, although he never again visited Ferrara, his old disposition to flit about from place to place seems to have clung to him like a disease. In this singular mode of existence he met with the strangest vicissitudes of fortune. One day he would be the most conspicuous object at a splendid court, crowned with lavish honours by the prince, and basking in the admiration of all beholders; another, he would be travelling alone on the highway, with weary steps and empty purse, and reduced to the necessity of borrowing, or rather begging, by the humblest suit, the means of sustaining existence. Such was his life for six or seven years. At last, in November, 1594, he made his appearance at Rome. It was resolved that the greatest living poet of Italy should be crowned with the laurel in the imperial city, as Petrarch had been more than two hundred and fifty years before. The decree to that effect was passed by the Pope and the Senate; but ere the day of triumph came, Tasso was seized with an illness, which he instantly felt would be mortal. At his own request, he was conveyed to the neighbouring monastery of St. Onofrio, the same retreat in which, twenty years before, his father had breathed his last; and here, surrounded by the consolations of that faith, which had been through life his constant support, he patiently awaited what he firmly

believed would be the issue of his malady. He expired in the arms of Cardinal Cinthio Aldobrandini, on the 25th of April, 1595, having just entered upon his fifty-second year. The Cardinal had brought him the Pope's benediction, on receiving which he exclaimed, "This is the crown with which I hope to be crowned, not as a poet in the Capitol, but with the glory of the blessed in heaven."

Critics have differed widely in their estimate of the poetical genius of Tasso, some ranking the Jerusalem Delivered with the grandest productions of ancient or modern times, and others nearly denying it all claim to merit in that species of composition of which it professes to be an example. Nothing certainly but the most morbid prejudice could have dictated Boileau's peevish allusion to "the tinsel of Tasso," as contrasted with "the gold of Virgil;" but although the poem is one of surpassing grace and majesty, the beauty and loftiness both of sentiment and of language by which it is marked are perhaps in a somewhat artificial style, and want the life and spell of power which belong to the creations of the mightier masters of epic song,—Homer, Dante, and Milton. His genius was unquestionably far less original and self-sustained than that of any one of these. It is not, however, the triumph of mere art with which he captivates and imposes upon us, but something far beyond that, it is rather what Wordsworth, in speaking of another subject, has called "the pomp of cultivated nature."



[Portrait of Tasso.]

National Education, Saxe-Weimar.—By a statute of the Grand Duchy every head of a family is *compelled* either to send his children to school, or else *to* prove that they receive adequate instruction under his own roof. Heavy penalties are attached to any breach of this statute, which is as old as the very infancy of Protestantism. In fact, it was designed as one of its safeguards; and even at the present day, it may be defended on the score of sound policy; for what means can be pointed out which are more admirably adapted to promote social order and individual happiness than universal education, in harmony with rational Christianity? The immediate effect of the statute in question is to establish a schoolmaster in every village and hamlet throughout the country. There is not so much as a secluded corner, with a dozen houses in it, without its schoolmaster. None, therefore, can urge the want of opportunity in excuse of a breach of the law; and unless the parent can adduce the proof, which exempts him, he is bound to send his children to school after they have attained to their sixth year. Nay more, in order that the enactment may not be evaded, the commissioner of each district makes a regular periodical report, to the municipal authorities, of the children in his district who have reached, what may be termed, their "scholastic majority." Even in the smallest villages, every child pays twelve groschen (about 1*s.* 6*d.*) a-year to the master of the school. Though the amount is inconsiderable, it partakes of the nature of a tax on every head of a family, and it is obligatory upon him to pay it, unless his circumstances are extremely limited; in this case the district is bound to advance it. The master of the school makes out a list of the children in arrear of their fees every quarter, and transmits it to the Grand-ducal Government, by whom the amount is immediately advanced. The *minimum* of allowance to the master of a country school is 100 dollars (15*l.*) a-year, independently of lodging and firing; and that, to the master of a town school, is from 125 to 150 (19*l.* to 23*l.*), according to the size of the town. So soon as this *minimum* is exceeded, the instruction becomes gratuitous, and the district is no longer bound to pay up the quota for indigent children. There are, however, certain districts which are too poor to make any advances of that nature, and, in their case, recourse is had to the district church, which is in general possessed of monies, arising from ancient Catholic endowments, and is, therefore, expected to assist the district, where the education of its inhabitants requires such aid. Again, where this resource does not exist, there is a public fund, called "*Landschulen Fond*" (fund for country schools), which assists the church, district, or families of the district, in completing the *minimum* of the master's allowance. This fund arises from voluntary donations, legacies, and the produce of certain dues which the State assigns to it; such as for dispensations in matters of divorce, or marriage between relatives, &c. This is the only portion of the expense which the State itself is called upon to contribute, and it is of very inconsiderable amount; though there are as many schools as villages in the Grand Duchy, and every master has a competent remuneration, as well as a claim to one-half of his allowances in the season of old age or infirmity. Besides this, there is a fund for the assistance of his widow and children, which has been raised out of his own statutory contributions of 2*s.* 3*d.* per quarter and those of his colleagues; to which are added 350 dollars a-year from the State and Landschulen Fond; and certain dues laid aside for it by the Superior Consistory. All the national schools are under the superintendence of the local clergy, and the whole system is subject to the immediate control and direction of the Superior Consistory.—*Quarterly Journal of Education, No. IX.*

NOTICE.

Several letters have been received, making complaint of the disappointment experienced in there not being constantly Six Numbers of the Penny Magazine in a wrapper, and assuming that the price charged for the wrappers and stitching is exorbitant. The following statement may remove such a misconception:—

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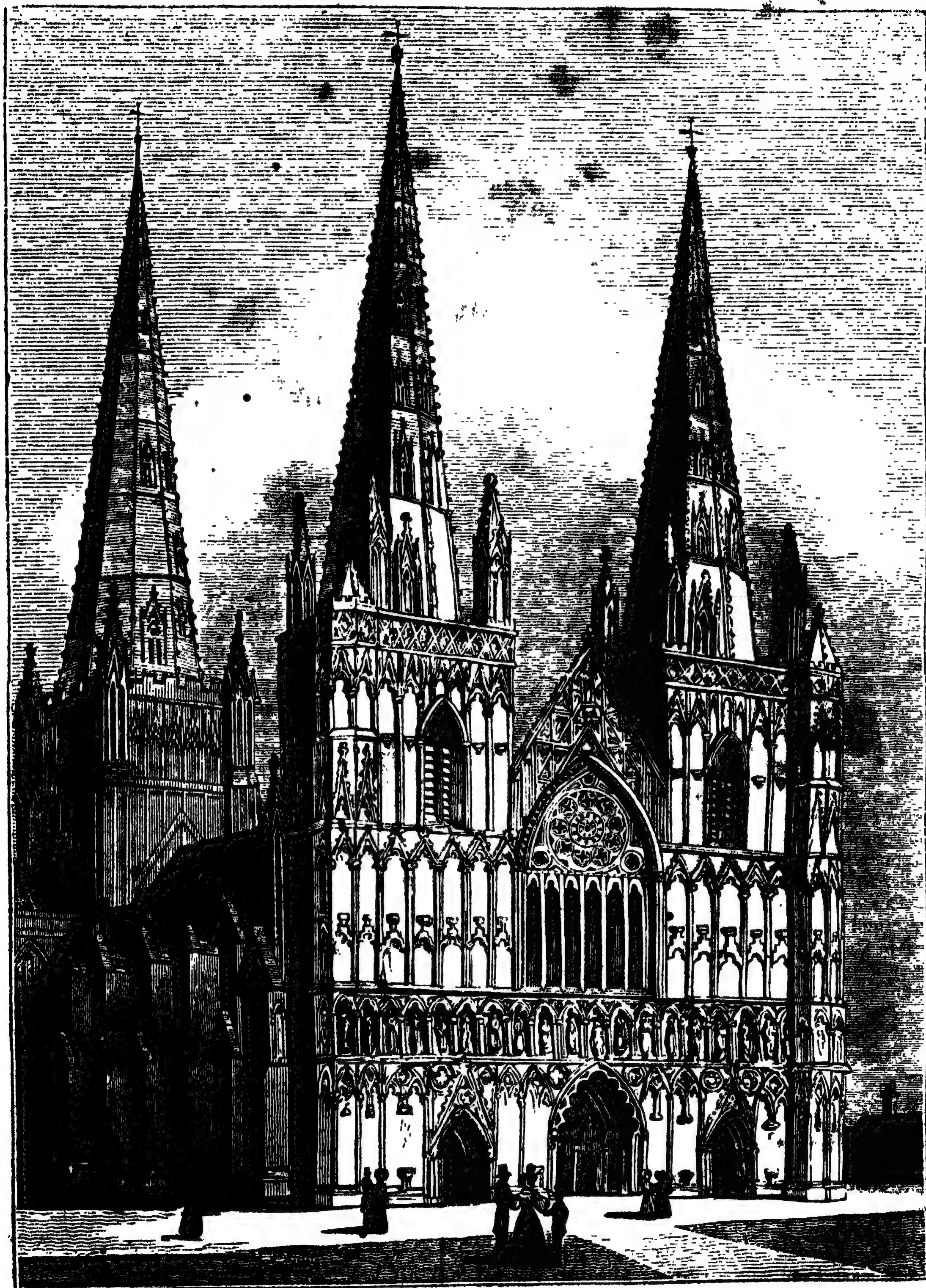
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THE CATHEDRAL OF LICHFIELD.



[West Front of Lichfield Cathedral.]

The Cathedral of Lichfield has no pretensions to vie in architectural grandeur with that of York and several others in England; but it is not without considerable beauties, both in its external appearance and in its interior. It makes no great show when seen from a distance; but it possesses one advantage, in which it is

almost singular among such buildings in this country, namely, the open space which it has to a considerable distance around it, enabling the spectator to obtain from the immediate neighbourhood nearly a perfect view of it on every side. It stands on a spot which is elevated above the rest of the city, and surrounded by a wall which in former times was fortified, in imitation of the manner in which convents and other ecclesiastical possessions used often, in France and other foreign countries, to be secluded and converted into a sort of forts, or strong holds. This portion of the city of Lichfield is still known by the name of the *Close*, just as in old Paris there were the *Clos* of the Augustines, the *Clos* of the Jacobins, &c. The Close contains a considerable number of houses besides the cathedral; but they neither crowd upon the sacred edifice, as they do in most other cities, nor are they of so mean a description as to present a disagreeable or unsuitable contrast in its vicinity. Some old trees ornament the northern side of the lawn, in the midst of which the cathedral stands, which, together with a sheet of water on the opposite side, give something of a rural air to the place.

The cathedral does not stand due east and west, as is usual with sacred buildings, but varies from the right line by an angle of about twenty-seven degrees, or not much less than the third part of a whole quarter of the compass. It is built in the customary form of a cross, the principal bar containing the nave of the church, the choir, and what is called the Lady Chapel. The extreme length is 403 feet; the shorter bar, or the transept, is 177 feet long. The width of the nave inside is about 66 feet. The principal front is the west. It is surmounted by two pyramidal spires; and a third, of the same form, rises from the centre of the building. The former are each 192 feet high; the latter rises to the height of 252 feet.

If tradition may be trusted, the spot on which Lichfield stands has a claim to be regarded as one of the most sacred in our island. Here it is said a thousand Christian martyrs were put to death at one time, in the persecution which raged in the beginning of the fourth century, under Dioclesian and Maximian. A field in the neighbourhood, which still bears the name of Christian Field, is pointed out as the scene of this slaughter; and etymologists have found a memorial of the same event in the name of the town itself. Lichfield, they contend, signifies, in Saxon, the Field of the Dead. Dr. Johnson, himself a native of Lichfield, has taken care to record this derivation in his Dictionary, with the circumstance by which it is supposed to be countenanced. But other writers have given other interpretations of the term. In the Saxon times Staffordshire was a part of the extensive and powerful kingdom of Mercia, which, according to Bede, was Christianized about the middle of the seventh century, upon its conquest by Oswy, king of Northumberland. Lichfield is said to have been erected into a bishopric in 656; the person first appointed to preside over the see being named Diuma. His immediate successors were Cellach, Trumhere, Jaruman, and Ceadda, commonly called St. Chad, who was consecrated in 669, and held the bishopric for two years. He obtained great renown on account of his piety, and for many ages after his death a miraculous atmosphere was believed to surround even the tomb that held his remains. The first cathedral is supposed to have been begun by his predecessor, Jaruman; but it was not completed till the year 700, in the time of Bishop Hedda. About the end of the eighth century the influence of King Offa obtained from the Pope the erection of Lichfield into an archbishopric; but it did not retain this dignity for more than two or three years. The diocese was originally one of great extent, comprehending nearly the half of England; but several other bishoprics have been formed out of it in later times. The diocesan used to style himself sometimes Bishop of Lichfield, sometimes of Coventry, having a cathedral, a palace, and a chapter in each city, till at last the common form came to be Bishop of Coventry and Lichfield. Bishop Hacket, who was appointed to the see immediately after the Restoration, changed the order of the two names; and the designation of the diocese ever since has been the Bishopric of Lichfield and Coventry.

The founder of the present cathedral is usually stated to have been Roger de Clinton, who came to the see in 1128. But the style of architecture indicates that very little of what now remains could have been erected by him. Mr. Britton is of opinion that it must have been mostly built in the course of the thirteenth and fourteenth centuries. Fuller tells us, in his Church History, that it was completed in the time of Bishop Heyworth, who came to the see in 1420. No documents, or hardly any, referring to its erection exist: all its records were destroyed either at the time of the Reformation, or during the civil wars in the seventeenth century. On the former occasion it was despoiled of all its ornaments which could be easily converted into another use; its richly decorated shrines and gold and silver vessels being all confiscated to the crown. At the commencement of the civil war the Close of Lichfield was fortified by the royalists, and the command intrusted to the Earl of Chesterfield. In March, 1643, the garrison here was attacked by Robert Greville, Lord Brooke, a zealous puritan, who is said to have endeavoured to invoke the aid of Heaven by a vow, that if he should succeed in his attempt he would level the cathedral with the ground. But on the 2d of the month, which happened to be St. Chad's day, and therefore, we may well believe, made the circumstance seem to many a very remarkable judgment, his lordship was shot dead as he walked along the street below, by a gentleman stationed on the great tower of the church. The garrison, however, were obliged to surrender on the third day after, when the parliamentary soldiers entered and took possession of the place. These followers of Lord Brooke did not quite throw down the cathedral, but they inflicted upon it both desecration and injury to no small extent. They exercised their barbarism, says Dugdale, ('Short View of the Late Troubles,') "in demolishing all the monuments, pulling down the curious carved work, battering in pieces the costly windows, and destroying the evidences and records belonging to that church; which being done, they stabled their horses in the body of it; kept courts of guard in the cross aisles; broke up the pavement; * * * and every day hunted a cat with hounds throughout the church, delighting themselves in the echo from the goodly vaulted roof." The parliamentary forces kept possession of the Close till the 21st of April, when they were again driven out by the royalists. It remained in the hands of the latter till July, 1646; when it was once more attacked, and compelled to admit a new garrison, after a brief resistance. The cathedral suffered greatly from these successive sieges. It was reckoned that no fewer than two thousand cannon-shot and one thousand five hundred hand grenades had been discharged against it; and the effect was that the three spires were nearly entirely battered down, and hardly any thing left standing except the walls. Even they were every where defaced and mutilated.

The restorer of the building was the excellent Bishop Hacket, already mentioned as having been appointed to the see after the return of Charles II. In the course of eight years, by unsparing exertion and liberality, he had succeeded, as far as it was possible, in repairing the sad devastations of the preceding quarter of a century. The structure has since, however, undergone considerable alterations at various times; and in particular about the close of the last century it received a complete renovation under the direction of the late Mr. Wyatt.

The finest parts of Lichfield Cathedral are the west front, which is very rich and splendid, and the Lady

Chapel, the painted glass in the windows of which, brought from the chapel of the nunnery of Herckenrode, in Liege, may probably vie with any thing of the kind in this country. The church contains a considerable number of tombs, but few of them interesting from their antiquity. Among those of modern date are one to the memory of Dr. Johnson, and another to that of Lady Mary Wortley Montague, who was also a native of Lichfield. There is also one in commemoration of the two female children of the Rev. W. Robinson, which is one of Chantrey's very finest works. For further information on the subject of the cathedral, the reader may consult Mr. Britton's History of its Architecture and Antiquities, Jackson's History of Lichfield, and Shaw's History of Staffordshire.

THEORY AND PRACTICE.

[From the American Quarterly Review.]

THE science of political economy, like other sciences, is a collection of general truths and principles, deduced from an extensive and accurate observation and collation of facts—not the limited experience of a single individual—but the extended experience of nations; not the facts of a single district or of one age, imperfectly observed and falsley reasoned from by an unformed mind—but facts from all countries and many centuries, diligently and minutely analyzed and compared, and the principles and truths deduced by many able men, whose minds, stored with various knowledge, accustomed to investigation, and trained to the art of reasoning, were devoted intensely, for years, to the subject. But there seems at the present day, even among persons sufficiently enlightened upon other matters, a great rage for what is called "practical knowledge"—a term difficult to define, but which, from the way in which it is generally used, appears to be synonymous with intuitive knowledge.

The professors of this species of knowledge term themselves "practical men," and seem to be of opinion that there is not *any* thing in heaven or earth not circumscribed within the limits of their philosophy. What they *see*, they believe—the facts of their own experience, the events which are passing around them, are the data upon which they build *their* theories; and their imperfect and confused deductions, from scanty and inaccurately observed facts, are by the vanity of ignorance preferred to the discoveries of science, and the conclusions of reason. "Practical knowledge" is, by these philosophers, opposed to theoretical knowledge. Theoretical appears, in their vocabulary, to mean any thing that is written in a regular methodical manner—and practical knowledge, the information gained, and the conclusions drawn from individual observation, and from reading newspapers and speeches in Congress.

It ought to be more generally known, that theory is nothing more than the conclusions of reason from numerous and accurately observed phenomena, and the deduction of the laws which connect causes with effects;—that practice is the application of these general truths and principles to the common affairs and purposes of life; and that science is the recorded experience and discoveries of mankind, or, as it has been well defined, "the knowledge of many, orderly and methodically digested and arranged, so as to become attainable by one."

Every man who observes a phenomenon, and attempts to account for it, or draws a conclusion from its occurrence, is guilty of theorizing. The "practical man," however, goes no further than the fact before him—he gives a reason for its occurrence, if he can, which not being capable of further application, and not comprehending any other facts, even if it be correct, is comparatively useless. The scientific man, not content with observing one fact, collects many, and by discovering their points of resemblance, and tracing the chain of causes and effects, arrives at a general principle or law, capable of extensive application and varied usefulness.

A "practical man" sees the lid forced off from a vessel of water, when the water is heated; if he attempts to give a reason, he says, that it was because the steam could not escape, and he resolves the next time to leave it a vent. The philosopher, from this phenomenon, is led to the examination of others, and through a train of investigation and discovery which terminates in the steam-engine.

The "practical man" goes to market in the morning, and always finds as many commodities as he wishes to purchase. If he thinks about so ordinary an occurrence, he supposes, very justly, that the owners of the commodities come to market because they expect to meet purchasers, and that they sell their goods, because they prefer having his money. A scientific man, from this phenomenon, and from a careful analysis of it and analogous facts, discovers the true principles which regulate demand and supply, with all their important results.

A "practical man" is told by his neighbour that he intends to withdraw from the business in which he is engaged, and invest his capital in another, where he has good reason to expect more profit. He commends the prudence of his friend, and perhaps looks closer to his own affairs. The scientific man, upon being told the like thing, meditates a little more deeply, and reasoning from particulars to generals, arrives at length at the conclusion that the industry of a country will be most productive when least interfered with.

The "practical man," if he happens to live near a manufactory, upon the introduction of an improvement in machinery, whereby the work formerly performed by six men can now be done by two, sees a number of poor labourers thrown out of employment, and a number of families reduced to want. He is induced to suppose that labour-saving machinery is an evil, and productive of poverty and wretchedness—and if he is a passionate man as well as a practical one, he thinks the workmen would serve their employers right by destroying the machines. The scientific political economist, on the contrary, from the examination and comparison of many facts, and from a train of comprehensive and accurate reasoning, is convinced, that notwithstanding the partial and transient evil caused by their introduction, every improvement in machinery by which the cost of production is diminished, is a permanent advantage to *all* classes of society.

Stage-Coaches.—The public have now been so long familiarized with stage-coach accommodation, that they are led to think of it as having always existed. It is however, even in England, of comparatively recent date. The late Mr. Andrew Thomson, sen., told me, that he and the late Mr. John Glassford went to London (from Glasgow) in the year 1739, and made the journey on horseback. Then there was no turnpike-road till they came to Grantham, within one hundred and ten miles from London. Up to that point they travelled on a narrow causeway, with an unmade soft road upon each side of it. They met from time to time strings of pack-horses, from thirty to forty in a gang, the mode by which goods seemed to be transported from one part of the country to another. The leading horse of the gang carried a bell to give warning to travellers coming in an opposite direction; and he said, when they met these trains of horses, with their packs across their backs, the causeway not affording room, they were obliged to make way for them, and plunge into the side road, out of which they sometimes found it difficult to get back again upon the causeway.

[An extract from Mr. D. Bannatyne's Scrap-Book, as given in Dr. Cleland's Statistical Account of Glasgow.]

THE POLAR BEAR.



[Polar Bears and Seal.]

In those desolate fields of ice which lock up the polar seas during a great part of the year, the White Bear (the *Ursus Maritimus* of Linnæus) finds an abode congenial to his hardy nature. Prowling over the frozen wastes, he satiates his hunger on the marine animals, such as seals, who break through the ice to breathe the open air; or he plunges into the sea in pursuit of his prey. Possessing an astonishingly acute scent, great activity and strength, and equal cunning, he contrives to support existence in regions where it might be thought that so large a quadruped must necessarily perish. Ever watchful, he ascends the hills of ice, called hummocks, to extend his range of observation over the wide plain where a solitary seal may perhaps be resting; or to snuff the tainted air, by which he knows that some remains of a whale, or a walrus (sea-horse), deserted by the fishermen of Europe or the native Eskimaux, will afford him an ample feast. He doubtless often suffers long and extreme hunger; for the seal, which forms his chief subsistence, is as vigilant as the bear; and he is often carried out to sea upon some small island of ice, where he may remain for days without the possibility of procuring food. The Polar Bear has been seen floating in this way at a distance of two hundred miles from any land. Swimming excellently, he, however, often travels from one island of ice to another; or visits the shore, where he commits fearful ravages. In Iceland, where these destructive animals sometimes land, the inhabitants immediately collect together to destroy them. Near the east coast of Greenland, according to Captain Scoresby, in his account of the Arctic Regions, they have been seen on the ice in such quantities, that they were compared to flocks of sheep on a common.

In the Zoological Gardens there is a polar bear, from which the representation of one in the preceding woodcut was taken. In the British Museum there is a stuffed specimen of considerably larger dimensions. The animal is ordinarily from 4 to 5 feet high, and from 7 to 8 feet long, weighing from 600 lbs. to half a ton. Barentz, an early voyager in these regions, killed two enormous white bears in 1596, the skin of one of which measured 12 feet, and that of the other 13 feet. The cubs of this powerful animal are, however, not larger than rabbits. Hearne, a traveller of great authority, states that he has seen their foot-prints on the snow not larger than a crown-piece, when the impression of their dam's foot measured 14 inches by 9.

The polar bear generally retreats from man; but when attacked he is a formidable enemy. Captain Scoresby, in his Voyage to Greenland, gives several interesting anecdotes, which strikingly exhibit the power and courage of the animal. Our readers will be gratified by these extracts :—

"A few years ago, when one of the Davis's Strait whalers was closely beset among the ice at the 'south-west,' or on the coast of Labrador, a bear that had been for some time seen near the ship, at length became so bold as to approach alongside, probably tempted by the offal of the provision thrown overboard by the cook. At this time the people were all at dinner, no one being required to keep the deck in the then immoveable condition of the ship. A hardy fellow who first looked out, perceiving the bear so near, imprudently jumped upon the ice, armed only with a handspike, with a view, it is supposed, of gaining all the honour of the exploit of securing so fierce a visitor by himself. But the bear, regardless of such weapons, and sharpened probably by hunger, disarmed his antagonist, and seizing him by the back with his powerful jaws, carried him off with such celerity, that on his dismayed comrades rising from their meal

and looking abroad, he was so far beyond their reach as to defy their pursuit."

"A circumstance communicated to me by Capt. Munroe of the Neptune, of rather a humorous nature as to the result, arose out of an equally imprudent attack made on a bear, in the Greenland fishery of 1820, by a seaman employed in one of the Hull whalers. The ship was moored to a piece of ice, on which, at a considerable distance, a large bear was observed prowling about for prey. One of the ship's company, emboldened by an artificial courage, derived from the free use of rum, which in his economy he had stored for special occasions, undertook to pursue and attack the bear that was within view. Armed only with a whale-lance, he resolutely, and against all persuasion, set out on his adventurous exploit. A fatiguing journey of about half a league, over a yielding surface of snow and rugged hummocks, brought him within a few yards of the enemy, which, to his surprise, undauntedly faced him, and seemed to invite him to the combat. His courage being by this time greatly subdued, partly by evaporation of the stimulus, and partly by the undismayed and even threatening aspect of the bear, he levelled his lance, in an attitude suited either for offensive or defensive action, and stopped. The bear also stood still; in vain the adventurer tried to rally courage to make the attack; his enemy was too formidable, and his appearance too imposing. In vain also he shouted, advanced his lance, and made feints of attack; the enemy, either not understanding or despising such unmanliness, obstinately stood his ground. Already the limbs of the sailor began to quiver; but the fear of ridicule from his messmates had its influence, and he yet scarcely dared to retreat. Bruin, however, possessing less reflection, or being regardless of consequences, began, with audacious boldness, to advance. His nigh approach and unshaken step subdued the spark of bravery and that dread of ridicule that had hitherto upheld our adventurer; he turned and fled. But now was the time of danger; the sailor's flight encouraged the bear in turn to pursue, and being better practised in snow-travelling and better provided for it, he rapidly gained upon the fugitive. The whale-lance, his only defence, encumbering him in his retreat, he threw it down, and kept on. This fortunately excited the bear's attention; he stopped, pawed it, bit it, and then renewed the chase. Again he was at the heels of the panting seaman, who, conscious of the favourable effects of the lance, dropped one of his mittens; the stratagem succeeded, and while Bruin again stopped to examine it, the fugitive, improving the interval, made considerable progress a-head. Still the bear resumed the pursuit with a most provoking perseverance, except when arrested by another mitten, and finally, by a hat, which he tore to shreds between his fore-teeth and paws, and would, no doubt, soon have made the incautious adventurer his victim, who was now rapidly losing strength, but for the prompt and well-timed assistance of his shipmates—who, observing that the affair had assumed a dangerous aspect, sallied out to his rescue. The little phalanx opened him a passage, and then closed to receive the bold assailant. Though now beyond the reach of his adversary, the dismayed fugitive continued onwards, impelled by his fears, and never relaxed his exertions until he fairly reached the shelter of his ship. The bear once more came to a stand, and for a moment seemed to survey his enemies with all the consideration of an experienced general; when, finding them too numerous for a hope of success, he very wisely wheeled about, and succeeded in making a safe and honourable retreat."

The sagacity of the polar bear is well known to the whale fishers. They find the greatest difficulty in entrapping him, although he fearlessly approaches their vessels. The following instances of this sagacity are very curious:—

"A seal lying on the middle of a large piece of ice, with a hole just before it, was marked out by a bear for its prey, and secured by the artifice of diving under the ice, and making its way to the hole by which the seal was prepared to retreat. The seal, however, observed its approach, and plunged into the water; but the bear instantly sprung upon it, and appeared, in about a minute afterwards, with the seal in its mouth.

"The captain of one of the whalers being anxious to procure a bear, without wounding the skin, made trial of the stratagem of laying the noose of a rope in the snow, and placing a piece of kreng within it. A bear, ranging the neighbouring ice, was soon enticed to the spot, by the smell of burning meat. He perceived the bait, approached, and seized it in his mouth; but his foot, at the same moment, by a jerk of the rope, being entangled in the noose, he pushed it off with the adjoining paw, and deliberately retired. After having eaten the piece he carried away with him, he returned. The noose, with another piece of kreng, being then replaced, he pushed the rope aside, and again walked triumphantly off with the kreng. A third time the noose was laid; but, excited to caution by the evident observation of the bear, the sailors buried the rope beneath the snow, and laid the bait in a deep hole dug in the centre. The bear once more approached, and the sailors were assured of their success. But Bruin, more sagacious than they expected, after snuffing about the place for a few moments, scraped the snow away with his paw, threw the rope aside, and again escaped unhurt with his prize."

The female polar bear is as fierce in her hostility as the male; but nothing can exceed the affection which she feels for her young. The difficulty of procuring food for them, and the hardships to which they are exposed, no doubt call forth this quality. Some of the instances upon record are as singular as they are affecting. The following is related in one of the Polar Voyages:—

"Early in the morning, the man at the mast-head gave notice that three bears were making their way very fast over the ice, and directing their course towards the ship. They had probably been invited by the blubber of a sea horse, which the men had set on fire, and which was burning on the ice at the time of their approach. They proved to be a she-bear and her two cubs; but the cubs were nearly as large as the dam. They ran eagerly to the fire, and drew out from the flames part of the flesh of the sea-horse, which remained unconsumed, and ate it voraciously. The crew from the ship threw great pieces of the flesh, which they had still left, upon the ice, which the old bear carried away singly, laid every piece before her cubs, and dividing them, gave each a share, reserving but a small portion to herself. As she was carrying away the last piece, they levelled their muskets at the cubs, and shot them both dead; and in her retreat, they wounded the dam, but not mortally.

"It would have drawn tears of pity from any but unfeeling minds, to have marked the affectionate concern manifested by this poor beast, in the last moments of her expiring young. Though she was sorely wounded, and could but just crawl to the place where they lay, she carried the lump of flesh she had fetched away, as she had done the others before, tore it in pieces, and laid it down before them; and when she saw they refused to eat, she laid her paws first upon one, and then upon the other, and endeavoured to raise them up. All this while it was piteous to hear her moan. When she found she could not stir them, she went off, and when at some distance, looked back and moaned; and that not availing to entice them away, she returned, and smelling around them, began to lick their wounds. She went off a second time, as before, and having crawled a few paces, looked again behind her, and for some time stood moaning. But still her cubs not rising to follow her, she returned to them again, and with signs of inexpressible fondness, went round first one and then the other, pawing them, and moaning. Finding at last that they were cold and lifeless, she raised her head towards the ship, and growled her resentment at the murderers, which they returned with a volley of musket balls. She fell between her cubs, and died licking their wounds."

MINERAL KINGDOM.—Section 5.

The subjects which it is the province of the geologist to investigate, are by no means confined to questions concerning mineral substances, but embrace a wider field, involving many considerations intimately connected with the history of several tribes of animals and plants. As it is not possible to give even a brief outline of the doctrines of geology without referring to the great orders and classes into which naturalists have divided the animal kingdom, before proceeding, as we proposed in the last section, to describe the divisions of the stratified

rocks which geologists have established, and which are founded mainly upon the distinctive characters afforded by the remains of organized bodies contained in the different strata, it will be necessary to say a few words upon the classification of animals, in order to render the terms we must employ more intelligible to those of our readers who are unacquainted with the subject.

Animals are divided into four great branches, distinguished by the terms *Vertebrated*, *Molluscous*, *Articulated*, and *Radiated*. The FIRST DIVISION includes all those animals which are provided with a backbone; and because the smaller bones or joints of which it is composed are called by anatomists *vertebræ* (from a Latin word signifying *to turn*) the individuals that belong to this division are called *Vertebrated Animals*. It is subdivided into four classes; 1. *Mammalia*, comprehending man, land quadrupeds, and the whale tribe; that is, all animals which give suck to their young; the term being derived from *mamma*, the Latin name of that part of the body from which the milk is drawn. 2. *Birds*, of all kinds. 3. All those animals called *Reptiles* by naturalists: the word means nothing more than that they creep, and is derived from the Latin verb "to creep," but it has in common language a far more extended sense than that to which it is restricted in natural history. Frogs, serpents, lizards, crocodiles, alligators, tortoises, and turtles, are reptiles, in the sense of the word as used by naturalists. 4. *Fishes*, of all kinds, except the whale tribe, which belongs to the class *mammalia*.

The SECOND DIVISION includes tribes of animals which have no bones, and because their bodies contain no hard parts, they are called *Molluscous Animals*, from a Latin word signifying soft. But with a few exceptions they have all a hard covering or shell to which they are either attached, or in which they can enclose themselves, and be preserved from injuries to which, from their soft nature, they would otherwise be constantly exposed. There are six classes in this division, founded on certain peculiarities of anatomical structure in the animal, but these we shall not notice; for, without a much longer description than we can enter upon, it would be a useless enumeration of hard names. It will answer our present purpose much better to say, that the animals belonging to this division may be classified according to differences in the forms of their hard covering or shells, for it is the hard parts of animals which furnish the records of their former existence; these only are preserved imbedded in the strata, all traces of the flesh or other soft parts, as far as form is concerned, having entirely disappeared. MOLLUSCOUS *Animals*, therefore, are divisible into, 1. *Univalves*, that is, animals armed with a shell or valve forming one continuous piece, such as snails and whelks. 2. *Bivalves*, or those having two shells united by a hinge, such as oysters, cockles, &c. 3. *Multivalves*, or those having more than two shells, of which the common barnacle is an example.

The THIRD DIVISION is assigned to what are called *Articulated Animals*, these having a peculiar anatomical structure, called articulations, from *articulus*, Latin for a little joint. It is subdivided into four classes; 1. *Annelides*, or those having a ringed structure, from *annulus*, Latin for ring: leeches and earth-worms are examples. 2. *Crustacea*, or those which have their soft bodies and limbs protected by a hard coating or *crust*, which in common language we also call shell, such as lobsters, crabs, and prawns. 3. *Spiders*, which form a class by themselves. 4. *Insects*, such as flies, beetles, bees, and butterflies.

The FOURTH DIVISION comprehends a great variety of animals which have an anatomical structure like an assemblage of rays diverging from a common point, and from which they are called *Radiated Animals*, *radius* being Latin for ray. It contains five classes, but as three of these are animals without hard parts, we may pass them over; of the remaining two, the one contains the *echini* or sea urchins; the other, the very numerous tribe called zoophites, from two Greek words signifying animal and plant, because the animal is fixed to the ground and builds its strong habitation in the form of a shrub or branch or leafy plant. Corals and sponges belong to this class, and among all the different animal remains that are found in the strata, there is no class which bears any proportion in point either of frequency of occurrence or in quantity equal to this last.

The great divisions of animals, so far as the remains of species found in the strata are concerned, or as it is termed in a *fossil* state, are therefore briefly these:

I. Vertebrated Animals; *Classes*—Mammalia, Birds, Reptiles, Fishes.

II. Molluscous Animals; *Classes*—Univalve, Bivalve, Multivalve Shells.

III. Articulated Animals; *Classes*—Crustacea, Insects.

IV. Radiated Animals; *Classes*—Echini, Zoophites.

Each class is farther divisible into several *families*; each family into several *genera*; each genus into several *species*, according as greater or minor points of resemblance and difference bring individuals near to each other. There are certain other great distinctions which it is necessary to mention, viz. that some animals eat animal food, the *Carnivorous*; others vegetable food, the *Graminivorous*; some can live both in the air and in water, the *Amphibious*. Among fishes, mollusca, and crustacea, some live in the sea, some in fresh water, some in both; and of those inhabiting fresh water some are peculiar to rivers, others to lakes. There are also land-shells, such as the common garden-snail. It is scarcely necessary to remind our readers that certain species are peculiar to particular regions of the earth, being adapted by their nature to the different temperature and other peculiarities that exist in different countries.

The number of distinguishable genera and species of fossil plants bears but a small proportion to that of fossil animal remains, and the notice we shall be called upon to take of them in the present brief outline of geology, is not such as to require us to enter into any previous explanation of the great divisions of the vegetable kingdom: this too we could not give so as to serve any useful purpose without entering into details that would lead us far beyond the limits to which we must restrict ourselves. We shall therefore now proceed to point out the great divisions into which the various stratified rocks have been separated, referring our readers to diagram No. 1, Section 2.

The lowest members in the order in which the stratified rocks are placed one above another, are distinguished by the great predominance of hard slaty rocks having a crystalline or compact texture, but chiefly by this circumstance, that they have not been found to contain any fragments of *pre-existing* rocks, or the remains of organized bodies. On this account they have been called the PRIMARY STRATA, as if formed prior to the existence of animal life, and as containing no evidence of other rocks having existed before them. That we cannot now discover animal remains in these strata is, however, no proof that they had not previously existed, because we meet with rocks containing organic remains which are so altered by the action of heat in those parts where they happen to have come in contact with a mass of granite or whinstone, that all traces of the organic remains are obliterated, these parts of the rocks acquiring a crystalline character analogous to what prevails in the primary strata. These last may have contained the remains of animals, but being nearest to the action of volcanic heat, they may have been so changed as to obliterate the shells and corals by their being melted as it were into the substance of the crystalline rock. The absence of the fragments of pre-existing rocks is a less questionable ground of distinction. From whence the materials composing these

primary strata were derived, is a question that it is not very likely any geological researches will enable us to solve; that they were in a state of minute division, were suspended in and gradually deposited from a fluid in an horizontal arrangement, and that they were subsequently elevated, broken, and contorted by some powerful force, prior to the deposition of the strata that lie over them, is beyond all doubt. There may also be beds of rock of great thickness, in which neither fragment nor organic remain has been found throughout a great extent of country, which nevertheless may not be primary, for if in any part of the same mass a single pebble or a single shell should afterwards be discovered, indubitably imbedded in it, one such occurrence would be as conclusive as a thousand, that a prior state of things had existed. It follows, therefore, that until the whole of an extensive district of such rocks were carefully examined, we could never be sure that they might not one day be discovered to be of secondary origin; there is nothing in the *mineral* structure of any one stratified rock that entitles us absolutely to say that other rocks and living bodies could not have existed prior to its formation. But as there are large tracts of country occupied by strata, in which neither fragments of pre-existing rocks nor organic remains have yet been discovered, geologists are justified in designating them the *primary* strata; to call them *primitive*, as they used to be, and indeed still are by some geologists, is to employ a term which expresses much more than we are entitled to assert.

The unstratified rock most usually associated with the primary strata is granite, of different varieties of composition, usually lying under them in great masses, and bursting through, forming lofty pinnacles, as in the Alps, and sometimes sending forth shoots or veins, which penetrate the superincumbent strata in all directions.

Immediately above the primary strata there commences another series, very like many of the rocks below them, in respect of mineral composition, but containing the remains of shells, and some pebbles, and interstratified with thick beds of limestone, including shells and corals. These rocks are penetrated also by granite, and, in common with the primary strata, form the great deposit of the metallic ores. They are, for want of a better term by which the class can be distinguished, usually called the *transition* strata, a name given by the elder geologists, because they were supposed to form a step or transition from the primitive state of the globe to that condition when it began to be inhabited by living bodies; in strictness they form the lowest members of the next great division of the strata, which is distinguished by the name of *the Secondary Rocks.* These will be treated of in our next section.

CRANMER.

On the 21st of March, 1556, Archbishop Cranmer underwent his death at Oxford by being burned at the stake. Thomas Cranmer was born in 1489, at Aslacton, in Nottinghamshire, of a family which is said to have come over with William the Conqueror. Having been entered of Jesus College, Cambridge, in 1503, he obtained a fellowship, but lost it on his marrying. His wife, however, having soon after died, he regained the appointment. He seems now to have made up his mind to a life of celibacy, and, applying himself to the study of divinity, commenced doctor in 1523. It was in 1529 that an accidental meeting at Waltham Abbey, in Essex, with Edward Fox, the king's almoner, and Stephen Gardiner, his secretary, occasioned his introduction to Henry VIII., then in the midst of his efforts to obtain a divorce from his first wife Catherine of Arragon. Cranmer is said to have suggested the plan of submitting the matter to the universities of Christendom instead of to the Pope; an expedient which as soon as the King was informed of, he exclaimed with an oath, "That man has the sow by the right ear." The author of the proposal was immediately sent for to court, made one of the royal chaplains, and rewarded with other ecclesiastical preferments. The following year he went abroad to manage the scheme which he had suggested of consulting the universities and the most learned divines; and on this commission he traversed a considerable part of France, Italy, and Germany. In the latter country he contracted at Nuremberg a second marriage with Anne, the niece of the wife of Osiander, an eminent protestant divine. There can be no doubt indeed that Cranmer's mind was by this time quite made up in favour of several of the most fundamental articles of belief maintained by the reformers—especially their denial of the necessity of celibacy in the clergy, and of the supremacy and dispensing power claimed by the Bishop of Rome. He had probably already formed the plan of employing his best endeavours to establish the Reformation in England. While he was still abroad the archbishopric of Canterbury became vacant in August, 1532, and the King immediately nominated him to the see, and commanded him to return home. On the 23d of May, 1533, he pronounced the sentence of divorce between Henry and Queen Catherine; and on the 28th of the same month he publicly confirmed the marriage which the King had previously contracted with Anne Boleyn. He now exerted himself strenuously to forward every innovation in the discipline of the church which tended to weaken the strength of its existing constitution; and in this spirit both the translation of the Scriptures and the dissolution of the monasteries were promoted by him with great zeal. So long as Henry lived, however, he dared not attempt any direct change in the articles of religion. He was also during the whole of this reign obliged to keep his marriage a secret; and in 1539, on a statute (commonly called the Act for the Six Articles) being passed in parliament, notwithstanding his anxious opposition, enforcing among other things the celibacy of the clergy, he deemed it safest to send back his wife to Germany. After the accession of Edward VI. his power was much more unrestrained; and he exerted it so as to effect the thorough reform of the church both in discipline and in doctrine. On the death of Edward, Cranmer was induced, but not till after many importunities, to follow the example of all the other members of the Privy Council, and to sign the instrument declaring the crown to have fallen to Lady Jane Grey. After the failure of the attempt to accomplish this settlement, the share which he had thus reluctantly taken in the affair was gladly made the pretence for destroying so formidable an enemy as he was likely to prove of that restoration of the old religion which was now contemplated. Accordingly, being brought to trial, he was found guilty of high treason; on which the revenues of his archbishopric were immediately sequestrated. Having, however, acknowledged his offence, and earnestly petitioned for mercy, he received her majesty's pardon. But this show of clemency was only intended to prepare the way for his ruin on a still more odious charge. On the 20th of April, 1554, he was brought along with Ridley and Latimer before commissioners appointed by the Queen, and after a short examination condemned with them as a heretic. It was found, however, that in consequence of the Pope's authority not being yet re-established in England, this sentence was void in law; and Cranmer was therefore retained in custody till the 12th of September, 1555, when he was again brought up before a commission which sat in St. Mary's Church, Oxford. The result was, that he was commanded to appear at Rome to defend himself within eighty days;—a cruel mockery of justice, inasmuch as, even had he been disposed to trust his cause to the decision of the Pope, he had no power of repairing to the appointed tribunal, being kept all

the while in close confinement. At the end of the assigned period he was condemned as contumacious, and was immediately subjected to the ceremony of degradation, which was performed by Bishops Bonner and Thirlby. Dressing the old man in archiepiscopal robes made of coarse canvas, they then stript them off him, piece by piece, and put on in their stead a thread-bare yeoman's gown, and a common cap. He was then remanded to prison. But the malignant ingenuity of his persecutors was not yet satisfied—they hoped to dishonour their victim still farther before consigning his body to the flames. In this view they assailed him by the most incessant and artful importunities, till they at length succeeded in their object of prevailing upon him to sign a recantation of his alleged errors, on an assurance that his life should be saved. No sooner had they obtained what they desired, than the paper was printed, and every where dispersed about. Meanwhile, on the 14th of February, an order was issued for the execution of the now doubly unfortunate man on the 21st of the following month. On that day, accordingly, he was brought first into St. Mary's Church, and there placed upon an elevated stage or platform opposite to the pulpit. Being called upon to repeat his confession, he expressed instead, with floods of tears, his penitence for the shameful weakness which had allowed it to be extorted from him. He was then led in haste to the spot intended for his execution, over against Baliol College. Here being stript to his shirt, and having his shoes taken off, he was tied to the stake, and the fire lighted. He held out his right hand steadily all the while, amidst the keenest of the flames, often repeating "This unworthy hand," in allusion to his recantation, which it had subscribed. The last words which he uttered were, "Lord Jesus, receive my spirit!" which he ejaculated oftener than once, looking up beseechingly to heaven.



[Portrait of Cranmer.]

Steam-Engines.—Engineers estimate the force of steam-engines by a measure which they term the horse-power. This power is the force required to raise or move 528 cubic feet of water, which weighs 33,000lbs., through one foot of space per minute. The power of a man may be assumed equal to that of raising 60 cubic feet, which weighs 3750lbs. avoir., through the space or height of one foot in a minute, or a proportionate weight to any other height, so that the height multiplied by the weight may give the product 3750lbs. A stout labourer will continue to work at this rate during eight hours per day*. A day's labour of a man working thus continuously may therefore be reckoned at 28,800 cubic feet of water being raised one foot high; and in this proportion a one-hundred-and-fourteen-horse power is equal to the power of about one thousand men. The horse-power of the steam-engine, thus assumed, is beyond the usual power of an ordinary horse, a two-horse power being equal in reality to that of three horses. For instance, the power of a ten-horse steam-engine is equal to the force exerted by fifteen horses acting together; and if the engine work night and day, while each horse can only work during eight hours out of the twenty-four, it will really perform the work of forty-five horses; for it would require that number of horses to be kept to execute the same quantity of work. Any statement of the comparative cost of steam, horse, and manual labour, can be, of course, only an approximation to the truth, as this cost must necessarily depend on the prices of fuel consumed by steam-engines, and on the expense of their wear and tear, of the keep of horses, and of the wages of manual labour—all of which vary with circumstances, and that not in a relative proportion. Data for ascertaining this point have been given by different writers. It is estimated that a heavy horse, working ten hours, will consume 15lbs. of oats and 14lbs. of hay in the course of the day. An engine of thirty-horse power, working ten hours, will consume about 2952lbs.; or, as nearly as possible, one chaldron of Newcastle coals.

* Farey on the Steam-Engine.

THE FIRST MILD DAY OF MARCH

It is the first mild day of March;
Each minute sweeter than before,
The red-breast sings from the tall larch
That stands beside our door.

There is a blessing in the air,
Which seems a sense of joy to yield
To the bare trees, and mountains bare,
And grass in the green field.

My sister! ('tis a wish of mine)
Now that our morning meal is done,
Make haste, your morning task resign,
Come forth and feel the sun.

Edward will come with you, and pray,
Put on with speed your woodland dress,
And bring no book: for this one day
We'll give to idleness.

No joyless forms shall regulate
Our living calendar:
We from to-day, my friend, will date
The opening of the year.

Love, now an universal birth,
From heart to heart is stealing,
From earth to man, from man to earth,
It is the hour of feeling.

One moment now may give us more
Than fifty years of reason:
Our minds shall drink at every pore
The spirit of the season.

Some silent laws our hearts will make,
Which they shall long obey:
We for the year to come may take
Our temper from to-day.

And from the blessed power that rolls
About, below, above,
We'll frame the measure of our souls:
They shall be tuned to love.

Then come, my sister! come, I pray,
With speed put on your woodland dress;
And bring no book: for this one day
We'll give to idleness.

Wordsworth.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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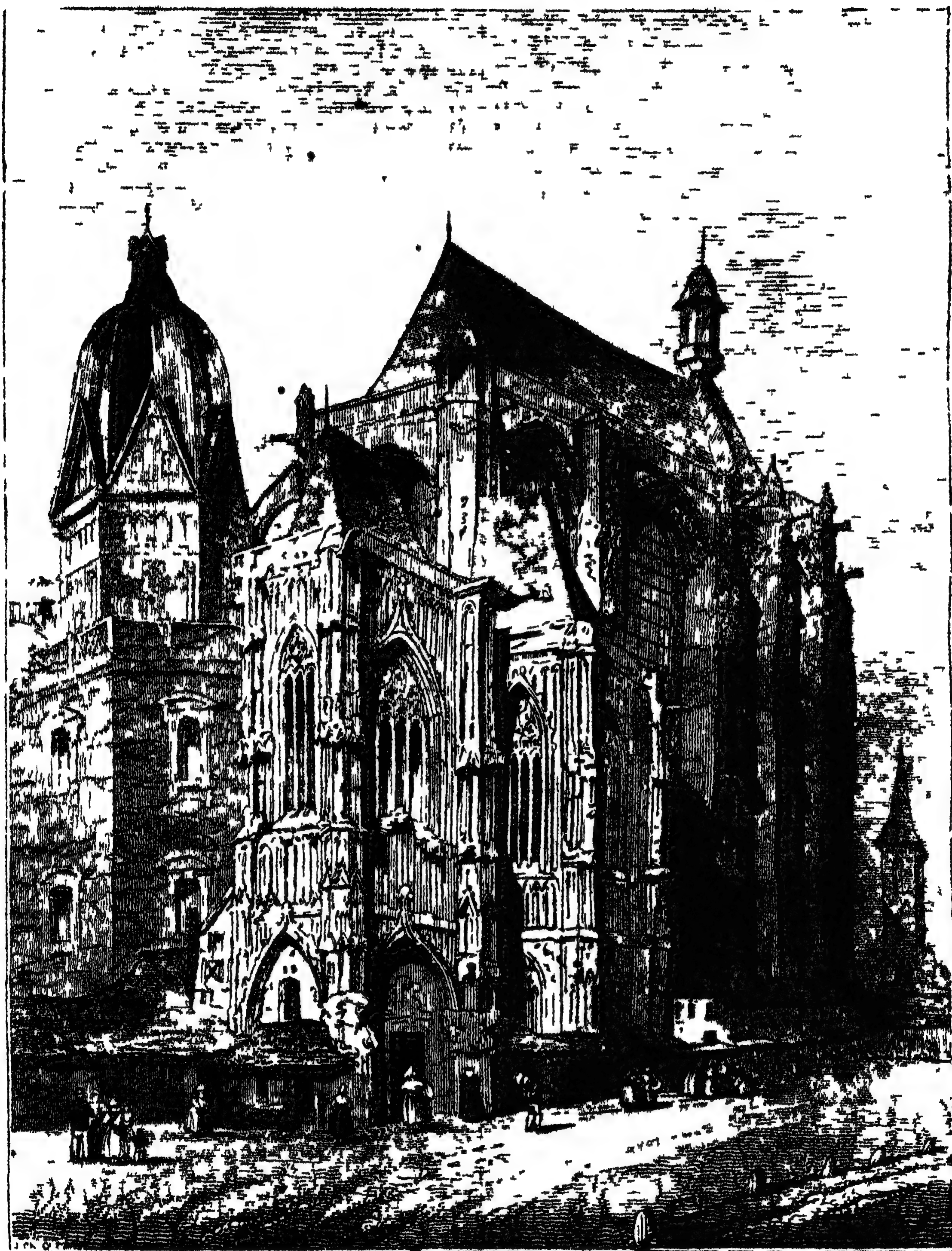
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AIX LA CHAPELLE.



[View of the Cathedral of Aix la-Chapelle.]

AIX LA CHAPELLE was once the royal residence of Charlemagne, the place where the Emperors of Germany were crowned, and a city of great importance as the centre of an extensive trade. At one period it is said to have contained above 100,000 inhabitants: but its principal attractions now are the monuments of its former greatness, and the natural springs to which it owes its name. Aix la-Chapelle, or *the waters of the church or chapel*, is the French name of this city, so called from its celebrated springs, and a chapel in the cathedral which con

tains a great number of relics. The name *Aix* has the same signification as the Latin 'aqua' (water), and is given to a place in the south of France, and to another in Savoy, both noted for their warm springs. Our town of *Bath*, in England, was known to the Romans by the name of Aquæ Solis, Waters of the Sun. The German name of Aix-la-Chapelle is Aachen, which also signifies 'waters.' *Bath* receives its *present* name from its springs. Baden, which is evidently akin to our word Bath, is the name of several places in Germany, and one in Switzerland, which have warm springs.

Aix-la-Chapelle is now the chief city of the district of Aix-la-Chapelle, one of the three divisions of the Prussian province of the Lower Rhine. It is in N. Lat. 50° 47', E. Long. 6° 3', and is about 75 miles E. by S. of Brussels. Its situation is very agreeable, being surrounded by hills which are ornamented with forests, buildings, and cultivated fields. The town consists of two parts, the inner and outer town, and contains seventy-five streets, some of which are tolerably well built; that called the New Street is the handsomest. The ramparts by which the city is surrounded serve as promenades.

The mineral springs of Aix-la-Chapelle attract a considerable number of strangers, who visit them for health or for pleasure as the English do Bath and Cheltenham. The hot springs have a temperature of about 143 degrees of Fahrenheit; and are strongly impregnated with sulphur, especially that called the Emperor's spring. In the market-place there is a fine source and a gilded bronze statue of Charlemagne: the bronze basin of the fountain is twenty-five feet in circumference. The cathedral, an ancient Gothic building, is more noted for its relics and the historical associations connected with it, than for its beauty, though it contains many objects which will attract a visitor's attention. It is loaded with small ornaments, which form a striking contrast with its pillars of granite, marble, and porphyry. The chair is still preserved in which so many German Emperors have been crowned since the time of Charlemagne: it is made of white marble of indifferent quality, and has no beauty of form to recommend it. Many of the ornaments of this cathedral were carried to Paris by the French, but restored after the downfal of Bonaparte. The tomb of Charlemagne is in the cathedral, under the altar of the choir, and is made of white marble.

This great Emperor chose as his burial-place the city which was his favourite residence, and which was indebted to him for its restoration from ruins, and for many of its edifices which remain to the present day. He spared no expense in procuring the most costly materials to beautify the place of his own choice, which he had erected into the capital of all his dominions north of the Alps. Till the dissolution of the Germanic empire, Aix-la-Chapelle was the place in which the coronation of the Emperors of Germany by right was celebrated, though in some instances this ceremony took place at Frankfort.

The cathedral has doors of bronze, about which there is a curious story told. "The citizens of Aix-la-Chapelle, as the story goes, being unable to raise money to complete the building, borrowed some from the devil, and surrendered in return the first soul that should pass the church-doors. When the building was finished, nobody could be found to fulfil the conditions of this wicked bargain; and so great was the fear of Satan's clutches in this most believing town, that the church might have stood empty till to-day, if a priest had not hit on the lucky device of hunting through the church a wolf which they had fortunately caught alive. The devil, full of spite at finding himself thus outwitted, slammed the bronze doors behind him with such violence that they cracked. To put unbelievers to shame, who might be bold enough to conjecture that the crack in the doors was caused by the wind violently shutting the doors, two bronze figures stand on the outside before the entrance, one of which is the wolf and the other the condemned soul of the wolf in the form of a monstrous pine cone*."

Aix-la-Chapelle is still a considerable town with a population of more than 36,000 people, and some manufactures of woollen cloth, needles, Prussian blue, hats, &c. It has a handsome theatre and a public library of 10,000 volumes.

About a quarter of a mile to the east of Aix-la-Chapelle, on the slope of a steep hill, is the little town of Burtschied, connected with the city by a pleasant walk. This place also contains springs both hot and cold, without any sulphur in them. The temperature of the two hot springs is respectively 158° and 137° of Fahrenheit. This place also manufactures woollen cloth and needles: the population is about 5000.

"The abbey of Burtschied," says Forster, a writer at the close of the last century, "is beautifully situated, and finished with all ecclesiastical splendour. Close by, a small wood runs towards a large reservoir, and as you advance you come to a narrow valley enclosed by woody hills, where several warm springs are soon discovered by the vapour that rises from them; and a large reservoir is quite filled with hot water. As you walk along a series of beautifully shaded reservoirs, you see the romantic ruins of the old castle of Frankenberg."



[Bronze Statue of Charlemagne.]

THE SHEPHERDS OF THE ABRUZZI.

We lately gave an account of the wandering Italians who are so frequently found in our streets; and we now propose to attempt a short description of a pastoral people in the South of Italy, who, though they do not quit their own country, make annual migrations with their flocks on an extensive scale and to considerable distances.

* George Forster, Ansichten von Niederrhein, &c. Neue auflage. Berlin, 1800. We are not quite sure that Forster (whose description is somewhat confused) alludes to the doors of the cathedral of Aix-la-Chapelle, which he calls the collegiate church. The cathedral has, however, bronze doors.

These are the Abruzzesi, or peasants of the Abruzzi, two mountainous provinces in the kingdom of Naples, which, comparing things with our own, may be called the Highlands of that country. The plains about Sulmona and Chieti, two of the most important cities in these parts, indeed the whole of the valley of the Pescara; the flats and the declivities of the hills that surround the beautiful lake of Celano; some strips of land along the coast of the Adriatic, and a few other places, are susceptible of profitable cultivation, and are well cultivated; but, generally speaking, the country is mountainous and rugged in the extreme, offering little to rural economy, save almost boundless sheep-walks and browsing grounds for goats. Nature has therefore made the inhabitants of this country a pastoral people, and they are so to a degree which can hardly be imagined but by those who have visited these much neglected but interesting provinces. Entering fairly into the Abruzzi, above the romantic town of Castel di Sangro (as you do, coming from Naples), the traveller finds himself in a new world, the simple, primitive manners of which are most striking. He no longer sees the vines hung in festoons from the elm-trees, nor the broad-bladed vividly green Indian corn, nor the exuberant soil bearing two crops, nor the flowering orchards and shady Italian pines, nor the thronging, noisy population he has left behind him in the agricultural and most fertile province of the Terra di Lavoro or Campagna Felice, but he sees immense flocks of sheep spread over the mountain pastures, he hears the continual tinkling of goat-bells from the mountain summits, he observes that the cottages and hamlets, instead of being surrounded by gardens and cultivated fields, are flanked and backed by sheep-cotes and stables; and that almost the only quality of person he meets on his way is a shepherd clad in his sheep-skin jacket, with sheep-skin buskins to his legs, and followed by his white, long-haired sheep-dog. Instead of the water being carried along in stone or brick aqueducts for the purposes of agriculture and horticulture, as in the lowlands, he sees it here and there, caught and conducted in hollowed trees, cut from the mountain's sides, which are fashioned not like our pipes but like open troughs, so that the flocks may drink out of them at any part of their course. Besides these simple ducts, he occasionally passes little stone fountains equally rustic in their structure, before which are placed a number of hollowed trees for the convenience of the sheep. In short, the aspect of the country is essentially pastoral.

Manufacturing and (though in a much less degree) even agricultural populations are found gradually to adapt themselves to the changes which are introduced into society and manners, and to keep somewhat near to the march of the age in which they live; but it is far different with a pastoral race inhabiting a wild and secluded country, and passing the greater part of their time in almost absolute solitude on the mountain's side: consequently the primitiveness of manners which we have mentioned as existing here is *indeed* most striking, and carries back the imagination to the early ages of the world. The Abruzzesi peasantry have the same taste for romantic traditions that distinguishes our highlanders and the inhabitants of mountainous countries generally; they are as superstitious—they have the same love of music, and their instrument is the same as that of our northern brethren, for their *zampogna* scarcely differs in any thing from the highland bag-pipe, which instrument, be it said, is also found in nearly all the mountainous countries of the world. Some of their superstitions are evident remnants of classic paganism; others are a compound of monkish legends and paganism, and the mass is, of course, what has arisen from the Romish church. They have a traditionary reverence for the name of their countryman Ovid, but, like the poor Neapolitans who believe that Virgil was a great magician, they make their poet's fame depend upon his having been a mighty adept in necromancy. In the town of Sulmona, the place of the poet's birth, they keep a rude stone statue which people have chosen to call Ovidio Nasone, though it is more probably the effigy of some portly abbot of the fourteenth century. As the writer of this article was standing before it one day, a shepherd boy, who was returning from the market in the town, took off his hat to it, as though it had been the image of a saint. The traveller did not then know Ovid's fame as a magician, and was much delighted at what he thought a mark of popular reverence to genius, and asked himself the question whether an English peasant would doff his cap to the statue of Shakspeare or of Milton.

The Abruzzesi shepherds are a fine race of men, and make excellent soldiers, particularly cavalry; though they are naturally averse to the military service. The best disciplined and steadiest troops in Murat's army were raised in this part of his kingdom. In former times the country was much infested by banditti, and one of the most famous robber chiefs mentioned in modern history—Marco Sciarra—was an Abruzzese. Except in times of execrable misgovernment, as under some of the Spanish viceroys, these depredations were almost confined to the frontiers and to the mountain passes that lead into the Roman states, and the troops of brigands were rather composed of Roman and Neapolitan outlaws, invited there by the facilities for plundering, and the security offered in those mountainous wilds, than of the native peasantry. Of late years scarcely an instance of brigandage has been heard of—except in the case of a band that came from a different part of the kingdom, and was soon suppressed, mainly by the peasants themselves. In 1823 the writer of this short account travelled through the greater part of the country—in the wildest places alone on horseback, or only with such a guide as he could pick up among the peasantry, and instead of robbers and cut-throats he found every where honest people, who were civil, and even hospitable.

Winter is felt in these mountains in great, and in some places in its utmost rigour. The lofty summits of the Gran Sasso d'Italia (the Great Rock of Italy, the highest peak in the Peninsula) are nearly always covered with deep snow—so are the mountains above Aquila, the capital of the provinces, and many others of the ridges; while the crevasses (rifts) in the superior parts of Monte Majello that towers above Sulmona offer enduring and increasing fields of ice and glaciers that may astonish even the traveller who has seen those of the Alps. Among the wild beasts the bear and the wolf are still found in considerable numbers. The "Piano di cinque miglie," or the Plain of five miles, which is a narrow flat valley almost at the top of the Apennines, but flanked by the summits of these mountains, and which is the principal communication with Naples, is subject to drifts, and those hurricanes called *tourmens*. Accumulations of snow frequently render the road impassable, and sometimes endanger and destroy life. The winds that blow from these mountains even so early as the end of summer, are often bleak and piercing. The numerous flocks that feed on, and beautify their pastures in summer, would droop and perish if exposed there in the winter. Consequently, at the approach of that season, the Abruzzesi peasants emigrate with them, into the lowlands of Puglia.

The plain of Puglia is an immense amphitheatre, whose front is open to the Adriatic Sea, and the rest of it enclosed by Mount Garganus and a semicircular sweep of the Apennines, prominent among which is the lofty cone of Mount Vultur (an extinct volcano, the craters of which are now romantic lakes). The mountains, however, generally defend the plain from the worst winds of winter, and the climate is as mild and genial throughout the year as might be expected from the favourable latitude of the place, and its trifling elevation above the

sea. The want of water, and the entire absence of trees which would attract humidity to the thirsty soil, have been reasons why this immense flat has been left almost untouched by the plough or spade. The great expanse presents the appearance of an eastern desert, over which, when not sparingly enlivened by the presence of the Abruzzesi and their flocks, you may travel in all directions for miles and miles without meeting a human being, or any signs of human industry—without seeing a tree or a bush, or any elevation in the dead flat, to mask the view of the Adriatic and the surrounding mountains.

It is said by the Neapolitan historians, that their king, Alfonso of Arragon, seeing this immense plain destitute of men, determined to people it with beasts; but it is probable, from the advantages it offers, and the difficulties of their own mountain climate, that the shepherds of the Abruzzi have in all ages resorted to it in winter as they now do, and that Alfonso merely regulated some laws and duties, whose principal tendency was to enrich the exchequer of the state by deriving some revenue from waste lands. In modern times a department of government has been appointed exclusively to the charge of the "Tavogliere di Puglia," as it is called in Neapolitan statistics; and the head of this department, who was generally a person of rank, was obliged to reside occasionally at Foggia. Of late years some changes have been introduced in this branch of the administration.

Every flock of sheep as it arrives is counted, and has to pay a certain sum, proportionate to its number, for the right of pasture; and small as are these rates, from the immense droves that come, they form an aggregate which, after the expenses of collecting, &c. are paid, annually gives to the Neapolitan government many thousand ducats.

Large sheds, and low houses built of mud and stone, that look like stabling, exist here and there on the plain, and have either been erected by the great sheep proprietors, or are let out to them at an easy rent by the factors of the Tavogliere. Other temporary homesteads are constructed by the shepherds themselves as they arrive; and a *few* pass the winter in tents covered with very thick and coarse dark cloth, woven with wool and hair. The permanent houses are generally large enough to accommodate a whole society of shepherds; the temporary huts and tents are always erected in groups, that the shepherds of the same flocks may be near to each other. The sheep-folds are in the rear of the large houses, but generally placed in the midst of the huts and tents. On account of the wolves, that frequently descend from the mountains and commit severe ravages, they are obliged to keep a great number of dogs, which are of a remarkably fine breed, being rather larger than our Newfoundland dog, very strongly made, snowy white in colour, and bold and faithful. You cannot approach these pastoral hamlets, either by night or day, without being beset by these vigilant guardians, that look sufficiently formidable when they charge the intruder (as often happens) by dozens or fifteen. They have frequent encounters with the wolves, evident signs of which [illegible] show in their persons, being [illegible] badly torn and maimed. The shepherds [illegible] of them, "of the right sort," are a match for [illegible] wolf.

The writer of this notice has several times seen a good deal of these Abruzzese shepherds in their winter establishments. The first time he came in contact with them was in the month of February, 1817, in the course of a journey through the southern provinces of the kingdom of Naples. He had no companion except the Calabrian pony that carried him, and a rough-haired Scotch terrier (a creature of a very different disposition), when he arrived at the almost undistinguishable site of the town of Cannæ, near which the fatal battle was fought, which is in the midst of the vast plain, about six miles from the town of Canosa (anciently Canusium), and not quite so far from the shores of the Adriatic. The most perfect solitude and stillness reigned there; but when he ascended the slightly elevated mound on which Cannæ had stood, he saw in a little hollow at a short distance a very long, low tenement, at the door of which were some men with sheep-dogs, and he perceived large flocks of white sheep nibbling the short grass on all the little hillocks around him, and over the plain on both sides the river Ofanto, on the identical field of the Roman and Carthaginian conflict, to a great distance. The only objects that remained on the site of Cannæ were some traces of walls that once girded the mound; on the summit of the mound some excavations, or subterranean chambers, with well or cistern-like mouths, which were open; and at a little distance two large slabs of stone, placed on end in the ground, and leaning against each other,—a simple monument, by which the peasantry of the country point out the field of Cannæ, or, as they call it, "the field of blood." Attracted by his appearance, for the sight of a stranger is a rarity, two of the men came up from the house to the traveller while he was measuring and examining the ground. Though uncouth in their appearance they were very courteous, and not only gave him several little pieces of local information, which showed that popular tradition had faithfully preserved the memory of the great events that once occurred in that solitude, but they assisted him to descend into one of the subterranean chambers, which they called (as the chambers in all probability had been) "granaries," or corn magazines *.

By the time the stranger had finished his examination and queries on the spot the sun was setting, and, at the invitation of the shepherds, he went down to the house. As he reached the rude but hospitable door, a tall venerable man with a snow-white sheepskin pelisse, who had just dismounted from a shaggy little mare, came up, and bade him welcome. This was the chief shepherd. He expressed his regret that the *tugurio* (hut) offered so little that a gentleman could eat; but all that he had the stranger (who was too hungry to be delicate) was welcome to. A youth, the old man's grandson, was immediately set to work to fry an omelette and some lardo or fat bacon. While this was doing, several other shepherds arrived, driving their flocks before them to the spacious cotes in the rear of the house—and later, there came others in a similar way, until all of the company were collected.

Besides his omelette and bacon, the traveller's repast was enriched with some good Indian corn-bread, some ricotta, which is a delicious preparation of goat's milk, and some generous wine bought at the neighbouring town of Canosa. [illegible] there is scarcely any [illegible] and before his meal was finished it was quite dark night. The kind old man did [illegible] evening at [illegible] shepherds [illegible] to Canosa if he would go, but if he would [illegible] here he [illegible] content himself with a shepherd's lodging for the night, he was welcome. The traveller did not hesitate [illegible] and when his pony was put up in a [illegible] to the house, he made himself very comfortable on a low wooden bench which the men covered with sheep-skins for him, near the fire.

When all the pastoral society was assembled, the patriarchal chief shepherd taking the lead, they repeated aloud, and with well modulated responses, the evening prayers, or the Catholic service of "Ave Maria." A boy then lit a massy old brass lamp, that looked as if it had been dug out of Pompeii, and on producing it said,

* Corn is still kept in subterranean chambers in the same manner at Canosa, Troja, Lucera, Foggia (a great grain-market), Manfredonia, and all this part of Apulia.

"Santa notte a tutta la compagnia"—(a holy night to all the company*). The shepherds then took their supper which was very frugal, consisting principally of Indian corn bread and raw onions with a very little wine. Some of them, after their meal, sat round the fire conversing with their visitor and others went to rest.

The whole of the interior of the room was occupied by one long apartment, in the middle of which was the fire-place, unprovided with a chimney, the smoke finding its way through the crannies in the roof and other apertures: on the sides of the apartment were spread the dried broad blades of the Indian corn and sheep-skins which formed the shepherds' beds, but there were two or three little constructions (not unlike the berths on board ship) made against the wall, which were warm and comfortable, and occupied by the old man and other privileged members of the society, one of whom kindly vacated his dormitory for the stranger. Besides these rustic beds and the wooden benches, the lamps and some cooking utensils, there was scarcely any other furniture in the room.

The scene that presented itself in that singular interior, as the traveller peeped out of his snug berth, was such as cannot easily be forgotten. The light of the lamp—and, when that was extinguished, the flickering flames of the fire in the centre of the room, disclosed in singular chiaroscuro the figures of the shepherds sleeping in their sheep-skins, along the sides of the room near to the fire; the rugged roof of the apartment, by smoke and time, was as black as jet, and the two extremities of the habitation were lost in gloom. Some old fire-arms hung by the berth of the principal shepherd; the strong knotty sticks and the long crooks of the men were placed against the wall. Several of the huge dogs lay dreaming with their noses to the fire, and round the fire-place still remained the rude wooden benches, on some of which the shepherds had thrown their cloaks and other parts of their attire in most picturesque confusion. Soon, however, the flames died on the hearth, the embers merely smouldered, and all was darkness, but not all silence, for the men snored most sonorously; the wind, that swept across the wide, open plain, howled round the house, and occasionally the dogs joined in its chorus. These things, however, did not prevent the traveller from passing a comfortable night, and with a sense of as great security, inasmuch as the poor shepherds were concerned, as he could have enjoyed had he been among friends in England.

The next morning, when he was about to continue his journey to Canosa, he offered money for the accommodations he had received. This the old shepherd refused, and seemed hurt by his pressing it upon him. Nothing then remained but thanks and a kind leave-taking.

These shepherds were to remain where they then were until the middle of spring, when they would slowly retrace their steps to the Abruzzi, whence they would again depart for the Pianura di Puglia at the approach of winter.

* This custom is found to prevail in nearly all the country ships. When the mozzo or cabin-boy lights the lamp he says, "Buona (or Santa) notte al capitano e a tutta la compagnia."

THE ESKIMAUX DOGS.

[Abridged from the Menageries, vol. I.]



[Eskimaux harnessing their Dogs to a Sledge.]

The Eskimaux, a race of people inhabiting the most northerly parts of the American continent, and the adjoining islands, are dependent upon the services of this faithful species of dog for most of the few comforts of

their lives; for assistance in the chase; for carrying burdens; and for their rapid and certain conveyance over the trackless snows of their dreary plains. The dogs, subjected to a constant dependence upon their masters, receiving scanty food and abundant chastisement, assist them in hunting the seal, the rein-deer, and the bear. In the summer, a single dog carries a weight of thirty pounds, in attending his master in the pursuit of game: in winter, yoked in numbers to heavy sledges, they drag five or six persons at the rate of seven or eight miles an hour, and will perform journeys of sixty miles a day. What the rein-deer is to the Laplander, this dog is to the Eskimaux. He is a faithful slave, who grumbles, but does not rebel; whose endurance never tires; and whose fidelity is never shaken by blows and starving. These animals are obstinate in their nature: but the women, who treat them with more kindness than the men, and who nurse them in their helpless state, or when they are sick, have an unbounded command over their affections; and can thus catch them at any time, and entice them from their huts, to yoke them to the sledges, even when they are suffering the severest hunger, and have no resource but to eat the most tough and filthy remains of animal matter which they can espy on their laborious journeys.

The mode in which the Eskimaux dogs are employed in drawing the sledge, is described in a very striking manner by Captain Parry, in his 'Journal of a Second Voyage for the discovery of a North-West passage:'—

"When drawing a sledge, the dogs have a simple harness (*annoo*) of deer or seal-skin, going round the neck by one bight, and another for each of the fore-legs, with a single thong leading over the back, and attached to the sledge as a trace. Though they appear at first sight to be huddled together without regard to regularity, there is, in fact, considerable attention paid to their arrangement, particularly in the selection of a dog of peculiar spirit and sagacity, who is allowed, by a longer trace, to precede the rest as leader, and to whom, in turning to the right or left, the driver usually addresses himself. This choice is made without regard to age or sex; and the rest of the dogs take precedency according to their training or sagacity, the least effective being put nearest the sledge. The leader is usually from eighteen to twenty feet from the fore part of the sledge, and the hindmost dog about half that distance; so that when ten or twelve are running together, several are nearly abreast of each other. The driver sits quite low, on the fore part of the sledge, with his feet overhanging the snow on one side, and having in his hand a whip, of which the handle, made either of wood, bone, or whalebone, is eighteen inches, and the lash more than as many feet, in length: the part of the thong next the handle is platted a little way down to stiffen it, and give it a spring, on which much of its use depends; and that which composes the lash is chewed by the women, to make it flexible in frosty weather. The men acquire from their youth considerable expertness in the use of this whip, the lash of which is left to trail along the ground by the side of the sledge, and with which they can inflict a very severe blow on any dog at pleasure.

"In directing the sledge, the whip acts no very essential part, the driver for this purpose using certain words, as the carters do with us, to make the dogs turn more to the right or left. To these a good leader attends with admirable precision, especially if his own name be repeated at the same time, looking behind over his shoulder with great earnestness, as if listening to the directions of the driver. On a beaten track, or even where a single foot or sledge-mark is occasionally discernible, there is not the slightest trouble in guiding the dogs; for even in the darkest night, and in the heaviest snow-drift, there is little or no danger of their losing the road, the leader keeping his nose near the ground, and directing the rest with wonderful sagacity."

The dogs of the Eskimaux offer to us a striking example of the great services which the race of dogs has rendered to mankind in the progress of civilization. The inhabitants of the shores of Baffin's Bay, and of those still more inclement regions to which our discovery ships have penetrated, are perhaps never destined to advance much farther than their present condition in the scale of humanity. Their climate forbids them attempting the gratification of any desires beyond the commonest animal wants. In the short summers, they hunt the rein-deer for a stock of food and clothing; during the long winter, when the stern demands of hunger drive them from their snow huts to search for provisions, they still find a supply in the rein-deer, in the seals which lie in holes under the ice of the lakes, and in the bears which prowl about on the frozen shores of the sea. Without the exquisite scent and the undaunted courage of their dogs, the several objects of their chase could never be obtained in sufficient quantities during the winter, to supply the wants of the inhabitants; nor could the men be conveyed from place to place over the snow, with that celerity which greatly contributes to their success in hunting. In drawing the sledges, if the dogs scent a single rein-deer, even a quarter of a mile distant, they gallop off furiously in the direction of the scent; and the animal is soon within reach of the unerring arrow of the hunter. They will discover a seal-hole entirely by the smell, at a very great distance. Their desire to attack the ferocious bear is so great, that the word *nennook*, which signifies that animal, is often used to encourage them, when running in a sledge; two or three dogs, led forward by a man, will fasten upon the largest bear without hesitation. They are eager to chase every animal but the wolf; and of him they appear to have an instinctive terror which manifests itself on his approach, in a loud and long-continued howl. Certainly there is no animal which combines so many properties useful to his master, as the dog of the Eskimaux.

The dogs of the Eskimaux lead always a fatiguing, and often a very painful life. In the summer they are fat and vigorous; for they have abundance of *kaow*, or the skin and part of the blubber of the walrus. But their feeding in winter is very precarious. Their masters have but little to spare; and the dogs become miserably thin, at a time when the severest labour is imposed upon them. It is not, therefore, surprising that the shouts and blows of their drivers have no effect in preventing them from rushing out of their road to pick up whatever they can descry; or that they are constantly creeping into the huts, to pilfer any thing within their reach: their chances of success are but small; for the people within the huts are equally keen in the protection of their stores, and they spend half their time in shouting out the names of the intruders (for the dogs have all names), and in driving them forth by the most unmerciful blows.

The hunger which the Eskimaux dogs feel so severely in winter, is somewhat increased by the temperature they live in. In cold climates, and in temperate ones in cold weather, animal food is required in larger quantities than in warm weather, and in temperate regions. The only mode which the dogs have of assuaging or deceiving the calls of hunger, is by the distension of the stomach with any filth which they can find to swallow. The painful sense of hunger is generally regarded as the effect of the contraction of the stomach, which effect is constantly increased by a draught of cold liquid. Captain Parry mentions that in winter the Eskimaux dogs will not drink water, unless it happen to be oily. They know, by experience, that their cravings would be increased by this indulgence, and they lick some clean snow as a substitute, which produces a less contraction of the stomach

than water. Dogs, in general, can bear hunger for a very long time, without any serious injury, having a supply of some substance for the distension of their stomachs.

STATISTICAL NOTES—(*Continued*).

(37.) We have adverted to the main articles of export from Great Britain, and it now remains to complete the view of British commerce, by specifying the articles of import. During the last half century, these latter have consisted of sugar, tea, corn, timber and naval stores, cotton wool, woods and drugs for dyeing, tobacco, silk, hides and skins, spices, bullion, &c. and considerable quantities have always been re-exported. The increase of our trade with all parts of the world may be seen by the following statement, which is given as the annual medium of five periods of peace. The annual imports from 1698 to 1701 were, upon an average, of the official value of £5,569,952; from 1749 to 1755 they were £8,211,346; from 1784 to 1792 they were £17,716,752; in 1802, £31,442,318; and from 1816 to 1822, £34,921,538. The average annual exports, during the same periods, were, respectively, £6,449,594; £12,220,974; £18,621,942; £41,411,966; and £53,126,195. The separate amount of the trade with each country may be found in Mr. Cæsar Moreau's Tables, from which the above is taken. We shall proceed to notice in succession some of the present principal articles of import.

(38.) *Sugar*. The sources from which the supply of sugar is derived are the West Indies, Brazil, Surinam, and the East Indies, including Java, Mauritius, and Bourbon. The average quantity exported from the whole of these countries exceeds half a million tons, of which about 190,000 are from the British West Indies. The consumption of sugar on the Continent amounts to about 260,000 tons, including what is sent from Great Britain. That of the United States is about 75,000 tons, including 40,000 tons produced in Louisiana. In this country, sugar did not come into general use till the latter part of the seventeenth century, and in 1700 the quantity consumed was about 10,000 tons. In 1754 it had reached 53,270 tons, and it now exceeds 180,000 tons, or 400,000,000 lbs. The duty on West India sugars is 24*s.* per cwt.; on East India sugars, 32*s.*; and on foreign sugars, 63*s.* per cwt. The price of sugar, exclusive of the duty, may be taken at from 22*s.* to 35*s.* per cwt. The average consumption of Great Britain is after the rate of 23 lbs. to each individual, but with reference to the consumption of coffee and tea, and otherwise, it might certainly be much greater than it is; and it is to be feared that Mr. Huskisson spoke too truly in 1829, when he affirmed that two-thirds of the poorer consumers of coffee drank that beverage without sugar. In Ireland, however, the consumption is still less, for the entire consumption of that country is under 45,000,000 lbs., which gives only 5¼ lbs. to each individual. It is not easy, moreover, to assign a good reason for the difference of duty between East and West India sugar. The gross receipt of the duties on all kinds of sugar in the year 1830 was £6,063,321.

(39.) Tea was hardly known in this country till the middle of the seventeenth century. In 1711 the quantity of tea consumed in Great Britain was 141,995 lbs.; in 1741, 1,031,540 lbs.; in 1771, 5,566,793 lbs.; in 1801, 20,237,753 lbs.; in 1811, 20,702,809 lbs.; in 1821, 22,892,913 lbs.; and in 1831, 26,043,223 lbs. The rapid increase of the consumption for about a century is no less remarkable than the fact, that, since the year 1800, the consumption, as compared with the population, has been steadily declining. It will appear, by the comparison of the above statement with the population in the years 1801, 1811, 1821, and 1831, respectively, that the consumption per head was in 1801, 1 lb. 13·6 oz.; in 1811, 1 lb. 10·2 oz.; in 1821, 1 lb. 9·4 oz.; and in 1831, 1 lb. 9·2 oz. This decrease, amounting to full 17 per cent., has been attributed to the high price occasioned in part by the trade being in the exclusive hands of the East-India Company, and in part by the high duties, which is 96 per cent. on teas sold at less than 2*s.* per lb., and 100 per cent. on all at or above 2*s.* per lb. Comparing the price of tea at the East-India Company's sales in London with the cost prices, duty free, in Hamburg, Rotterdam, and New York, there is a considerable excess in the London prices. For instance, in 1829 bohea was sold at the Company's sales in London at 1*s.* 6½*d.*, and in Hamburgh, 8½*d.*; congou was, in London, 2*s.* 4*d.*, and in Hamburgh, 1*s.* 2½*d.*; souchong, in London, 2*s.* 10½*d.*, and in Hamburgh, 1*s.* 1¾*d.*; hyson, in London, 4*s.* 1¾*d.*, and in Hamburgh, 2*s.* 8*d.*; and gunpowder, in London, 6*s.* 6½*d.*, and in Hamburgh, 3*s.* 5½*d.*; the common teas at Hamburgh being as good, and the finer teas decidedly better than in London.

(40.) Our supply of timber comes chiefly from the Baltic and the British North American provinces, and the duties paid upon its importation, in the year 1830, amounted to £1,319,233. The importance of a cheap supply of wood for building houses and ships, and for machinery, furniture, &c. is very obvious; but the price of good timber is much enhanced by the duties on all foreign wood, not being of the growth of the British plantations in America. Timber imported from foreign countries is made to pay £2. 15*s.* per load, whilst that from Canada pays only 10*s.* The practice of encouraging North American timber in preference to that of foreign countries took its rise in the year 1809, during the continental war. But the expediency of its continuance since the peace has been much doubted, for it has seriously affected the trade with the Baltic, which, in 1809, employed 428,000 tons of British shipping, and, in 1816, after seven years' operation of the discriminating duties, only 181,000 tons. The sacrifice of revenue has been estimated at £1,500,000 a year. The present government proposed, in the session of 1831, the gradual reduction of the duties on foreign timber to £2 a load, which would still have left a protection of 30*s.* a load to Canada timber, but the proposition was lost in the House of Commons. Without desiring to express any opinion upon the question between the Baltic and Canada timber, it may be observed generally, that it is the paramount duty of a legislature to prefer uniformly the general welfare to the advancement of private interests. It is true that all interests ought to be advocated and heard in Parliament; but the political economist ought also to be heard as the advocate of the mass of consumers; and although the function of the legislator differs from that of the public economist, inasmuch as the former is in the situation of a judge, and must determine the cases in which general principles should be modified to meet particular emergencies, still the modification ought to be regarded as the exception, and the general principle as the standing rule. Every trade and every interest urges, in its turn, that there is something peculiar in its circumstances, which entitles it to the particular favour of government; and if all were favoured, it is plain that the public would be injured, and the general interest compromised.

SEAL OF ALFRIC EARL OF MERCIA.

There are two modes of estimating the value of ancient monuments in reference to their *beauty* as pleasing the *eye*, and in reference to their *use* as conveying information to the *mind*.

The artist, who merely seeks a model for his chisel, or a subject for his pencil, too often despises the relic, which, though deficient in grace or elegance, is perhaps of the greatest value to the historical inquirer.

The collector, who makes antiquity his idol, estimates that which is old merely on account of its age; and his undiscriminating admiration of trifles which convey no pleasure to the ordinary spectator, and from which the learned cannot extract any instruction, tends to throw discredit upon the whole genus to which they belong.

A third individual, whom for want of a better term we will distinguish as the Archaeologist, bestows a due share of admiration upon the beauty of art, and yields an adequate respect for the elder day; but at the same time he considers that the best claim which ancient monuments, taking the word in its widest sense, have upon our attention, is derived from the lessons which they afford. They are frequently scattered leaves, belonging to the lost books of history, and supplying knowledge which we cannot find in the scanty and imperfect annals which have descended to posterity.



The seal above engraven, and lately discovered in digging a bank near Winchester, affords a most curious illustration of the manner in which ancient monuments fill up the chasms of written history.

The inscription "+ SIGILLUM ALFRICI AL." informs us that the noble to whom it belonged was Alfric, Earl or Alderman of Mercia, who holds a conspicuous though not a very honourable station in the transactions of the reign of Ethelred. He was the son of Earl Alfere, and was first noticed about 983. In 985, as the Saxon Chronicle tells us, he was "driven out of the land," being probably banished or outlawed by the Witanagemot. In 991 we find him again in England; and he is noticed as one of the nobles by whose treacherous and cowardly advice the English nation first consented to render that ill-fated tribute, the Danegelt; by which they gave an additional incitement to the hostility of their greedy and ruthless foes.

Alfric, notwithstanding his repeated acts of treachery, was much trusted by Ethelred; and in 992 he was appointed commander of the land forces destined to resist the Danish invaders.

But Alfric gave secret intelligence to the enemy, and the night before the battle, he "skulked away from the army," says the Saxon Chronicle, to "his great disgrace." The few remaining notices of his life relate principally to his acts of perfidy.

We have notice that Alfric was *Alderman* or *Earl* of Mercia. Now one of the most obscure questions in our constitutional history, arises out of the station of these dignitaries after the conquest. In the latter ages of Anglo-Saxon history these titles were used as equivalents to each other, and we may here remark that the gradual declension of the title of *Alderman* is a curious exemplification of the progress of our commonwealth. Originally all the chieftains of the Anglo-Saxon tribes were called Aldermen or Eldermen, Seniors or Senators. But when certain of these chiefs acquired a preponderance over the others then the title of *Alderman* sank a stage lower, and was applied to the minor or petty sovereigns who were compelled to acknowledge the supremacy of their more powerful neighbours. By degrees it sank further, till at last the *Alderman* became the magistrate of a town, and the introduction of the Danish term *Jarl*, or Earl, probably accelerated the downward progress of the older title. But we must revert to our seal and to the points which it elucidates.

In the Anglo-Norman era the Earls were created by the girding of the sword, a ceremony which continued in use to the reign of James I. That such a custom existed in the Anglo-Saxon era, we had, until the discovery of this seal, no authority except the assertion of John of Wallingford, a compiler, supposed to have flourished in the thirteenth century, and whose Chronicle contains many curious notices of Saxon affairs, not found in other writers, and which have been considered as suspicious because they rested upon his single authority. But those who so reason do not reason legitimately, because it is quite possible that John of Wallingford may have had access to materials now lost; and this seal, by exhibiting Alfric holding the *sword* of his dignity, precisely shows that Wallingford was correct in his description of the insignia of an Anglo-Saxon Earl. Therefore we may fairly infer that his authority is good with respect to other particulars of which no corroboration has been found. We confirm his evidence in a point so minute as to render it very improbable that it would have been introduced by a wilful forger. Thus we establish his general character as well as the important fact that the Anglo-Norman custom was retained after the conquest of the country by the Normans.

Various passages in the Anglo-Saxon laws and chronicles lead to the supposition that the Earls enjoyed a power approaching to sovereignty, and derived from the station which their predecessors possessed in the pristine ages of the Anglo-Saxon commonwealth.

This seal gives additional ground for adopting this theory.

Alfric's head is encircled by a *diadem* exactly like the diadem of King Ethelred, and which appears on King Ethelred's coins. In the middle ages the costume was not a matter of fancy as upon modern coins, which exhibit an English King in the garb of the Cæsars, nor were such tokens of dignity lightly assumed. It is therefore most probable that the royal diadem of Alfric denotes his possession of an authority bordering upon royalty.

A third question is elucidated by this seal. After the Norman Conquest it became the usage for kings and great men, and ultimately for all persons to confirm their legal acts, their grants, or their charters, by fixing an impression of their seal. At the present day, a seal is indispensable to a deed. This custom has been supposed to be Norman, and either introduced by Edward the Confessor, who was much *Normanized* in his habits, or by the Conqueror. This opinion, however, was in some measure shaken by the drawing of two or three Anglo-Saxon seals belonging to prelates who flourished before the reign of the Confessor, but there was no evidence to show that the laity used seals anterior to this period, except a single obscure passage in the Chronicle of William of Malmesbury, who flourished in the reign of Henry I. Here again our seal fills up the chasm.

If our limits allowed us, we could show that many other points of history are elucidated by this seal, which the workman who discovered it thought to be an old halfpenny*.

* The cast from which the above engraving is taken was made by a very ingenious artist, Mr. Doubleday, 32, Little Museum Street, who has formed the largest, the best, and the cheapest collection of casts from ancient seals, coins, &c. in the kingdom.

⁎ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

LONDON:—CHARLES KNIGHT, PALL-MALL EAST.

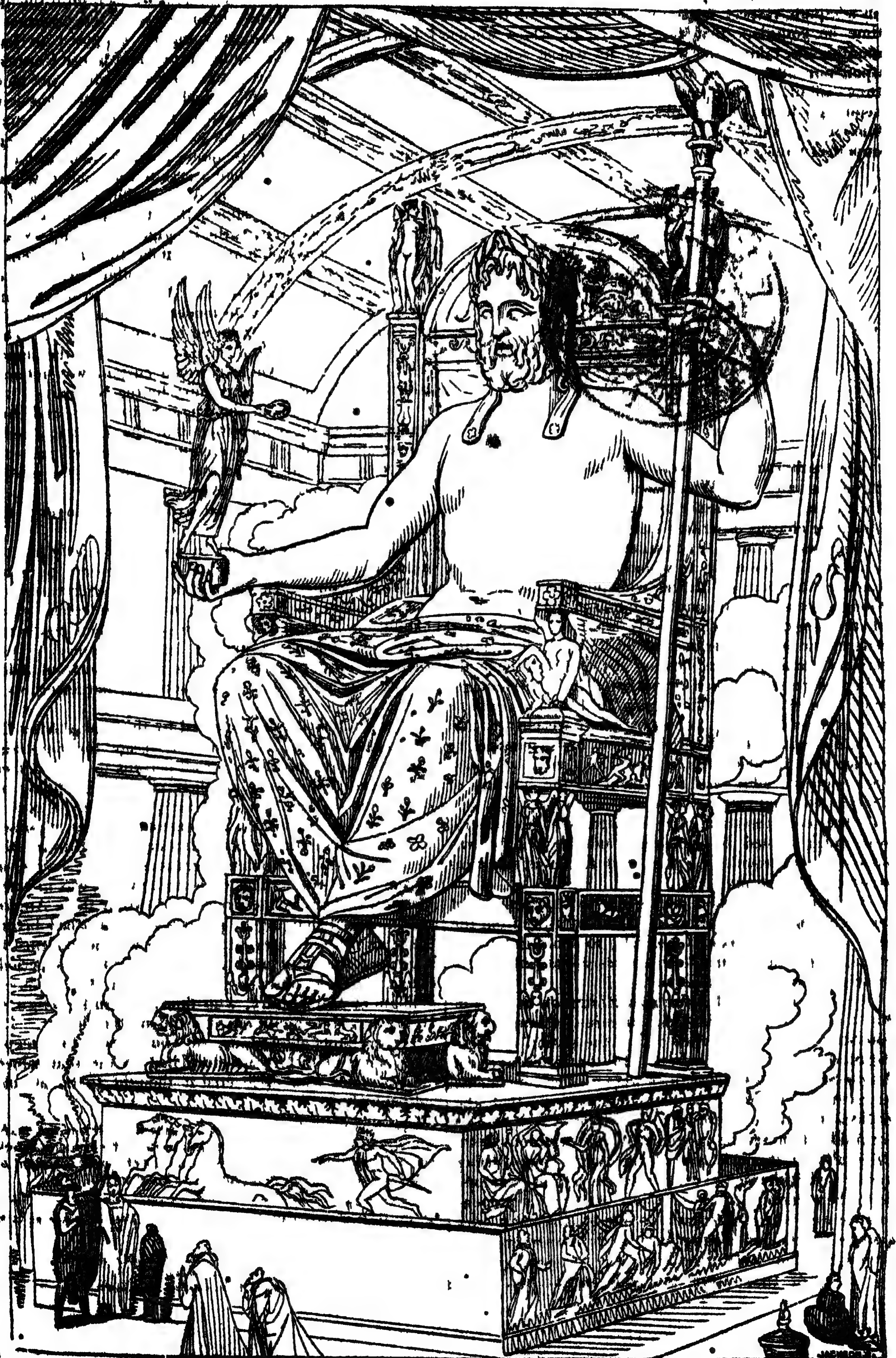
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[The Jupiter of Phidias, as restored by M. Quatremère de Quincy.]

THE JUPITER OF PHIDIAS.

During the administration of Pericles (B.C. 445), the genius of Phidias, the greatest sculptor of antiquity, conceived the daring idea of constructing statues of the gods of Greece which should unite the opposite qualities of colossal dimensions, and materials of comparative minuteness of parts. The sculpture of Greece had been gradually developing itself, through several ages, from the primitive use of the commonest woods as a material, to the employment of those of a rarer growth, such as ebony and cedar,—in clay, in marble, in metals (and those occasionally of the most precious kinds),—till it at length reached, according to the taste of antiquity, the highest point of perfection, in the combination, upon a great scale, of ivory and gold. Independently, indeed, of the delicate texture of ivory, its pleasing colour, and its capacity for the highest polish, there was something wonderfully stimulating to the imagination to consider that the colossal objects of the popular worship, which in their forms alone might well command the most profound reverence,—uniting, as they did, all the characteristics of the lovely, the majestic, and the terrible, in the idea of a superior intelligence—that even a single one of these great works of art had required for its completion the slaughter of hundreds of mighty beasts in distant regions.

The author who has left us the most interesting details of the state of art amongst the Greeks is Pausanias, who published his description of Greece at Rome, during the reigns of the Antonines. In his notices of the remarkable objects which existed in the Grecian cities, we are especially struck with his accounts of those prodigious monuments of sculpture in ivory, of which no specimen has been preserved to us, and which even appear to be repugnant to our notions of the beautiful in art. The remains of ancient statuary in marble and bronze can give us no definite idea of this species of sculpture. We perceive that the most precious substances had been laid under contribution to form these statues; and that the highest genius, calling to its assistance a mechanical dexterity, whose persevering contest with difficulties is alone matter of wonder, had rendered them worthy to be regarded as the perfect idea of the gods, whose individual temples they more than adorned. These extraordinary representations, there can be no doubt, were the glories of the sanctuaries of Athens, of Argos, of Epidaurus, and of Olympia; and were especially suited, by the grandeur of their dimensions, the beauty and rarity of their materials, the perfection of their workmanship, and the ideal truth of their forms, to advance the influence of a religion which appealed to the senses to compel that belief which the reason might withhold. We shall select a few passages from Pausanias and other writers, to justify this account of the peculiar excellence of the colossal statuary of ivory and gold. We begin with that of the Jupiter at Olympia, generally described as the master-piece of Phidias.

"The god," says Pausanias, "made of gold and ivory, is seated upon a throne. On his head is a crown representing an olive-branch. In his right hand he carries a Victory, also of gold and ivory, holding a wreath, and having a crown upon her head. In the left hand of the god is a sceptre shining with all sorts of metals. The bird placed on the summit of the sceptre is an eagle. The sandals of the god are of gold, and his mantle is also golden. The figures of various animals, and of all sorts of flowers, particularly lilies, are painted upon it. The throne is a diversified assemblage of gold, of precious stones, of ivory, and of ebony; in which figures of all kinds are also painted or sculptured."

The Greek traveller then proceeds to describe, at considerable length, the accessories of the statue and the throne, such as the ornaments in bas-relief and the base; but he does not furnish us with the dimensions of this great work. The omission is supplied by Strabo, in a manner which is sufficiently striking. "Phidias," he says, "had made his Jupiter sitting, and touching almost the summit of the roof of the temple; so that it appeared that if the god had risen up he would have lifted off the roof." The height of the interior of the temple was about sixty English feet.

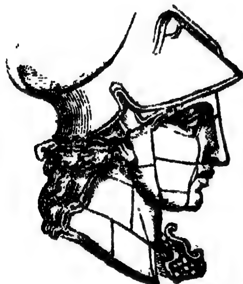
The description of Pausanias, inadequate as it is to give a precise idea of the splendour of this great work of art, which commanded the wonder and admiration of antiquity, is sufficient to show us that the effect produced by the combinations of various materials, in a great variety of colour and ornament, was essentially different from that of the sculpture of marble. The object of the artist was doubtless, in a great degree, to produce an illusion approaching much nearer to reality than the cold severity of sculptured stone. It resulted from the spirit of paganism, that every device of art should be employed to encourage the belief of the real presence of the god in his temple. The votaries indeed knew that the statues of the divinities were the work of human hands; and there was no desire to impose upon the popular credulity in this respect—for the statue of the Olympian Jupiter bore an inscription that it was made by Phidias. But, after every effort of genius had been exerted to produce the most overpowering effect upon the imagination, by an unequalled combination of beauty and splendour, the devices of the priests, or the natural tendency of the votaries to superstition, invented some legends which should give the work supernatural claims to the popular reverence. "The skill of Phidias received," says Pausanias, "the testimony of Jupiter himself. The work being finished, the artist prayed the god that he would make known if he was satisfied, and immediately the pavement of the temple was struck with lightning, at the spot where in my time stands a vase of bronze." But the grandeur of the workmanship was most relied upon to blend in the mind the intellectual idea and the material image of the divinity. "Those who go to the temple," says Lucian, "imagine that they see, not the gold extracted from the mines of Thessaly, or the ivory of the Indies, but the son himself of Saturn and Rhea, that Phidias had caused to descend from heaven." We have the record of Livy that the effect which this wonderful statue produced upon the mind was not limited to the superstition of the multitude. "Paulus Æmilius," says the historian, "looking upon the Olympian Jupiter, was moved in his mind as if the god was present." Up to the time of Antoninus, the reputation of this great work still drew a wondering crowd to Elis; for Arrian mentions that the chef-d'œuvre of art was such an object of curiosity that it was held as a calamity to die without having seen it.

The age immediately preceding that of Phidias had raised up edifices which awaited their final ornament from the hand of so daring a genius. The tyrannical government of Athens, at the period of the fiftieth Olympiad, had employed itself, as is the usage of despotism, in the execution of great architectural works The Temple of the Olympic Jupiter, in that city, commenced by Pisistratus, was upon so vast a scale that it required the resources of eight centuries for its completion. But the invasion of the Persians gave a more powerful impulse to the mind of Greece, to reconstruct the monuments which their great enemy had destroyed, than even the subtle policy of the tyrants of the preceding generation. The spoils of triumph enabled them to erect monuments in honour of their gods, which should be at the same time trophies of their victories. Within a very few years, were built the temples of Minerva at Athens, of Ceres at Eleusis, of Jupiter at Olympia, of Juno at Argos, and of Apollo Epicurius at Phigalia. At certain periods of society extraordinary impulses are given to the mind of nations, to produce great monuments of art; and thus we see that Greece in little more than half a century covered her land with

temples. In a similar manner many of the Gothic cathedrals of modern Europe were built at one and the same period. A new career of splendour was opened to Phidias by the magnificence of Pericles. The ancient temples had statues of gold and ivory; but they were not colossal. It was for him to create those gigantic monuments which should cause the shrine to appear too small for the divinity, and thus bring the idea of the infinite and finite into a contrast too powerful for the senses to withhold their homage.

The peculiar merit of this idea of Phidias did not consist in his mere adoption of the colossal form, but in his employment of a minute material to produce in combination the effect of a vast solid surface. The idea of colossal statuary doubtless belongs to the infancy of art. We find the gods of the Hindoo mythology of about three times the height of ordinary men, in the caves of Elephanta; and M. Deguignes saw images thirty feet high in a pagoda of China. The Greeks probably received the taste for the colossal from the Egyptians.

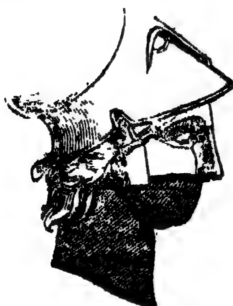
M. Quatremère de Quincy, a living French writer who has written several important works on subjects of art, has devoted a large folio to the history of the ancient sculpture in ivory. A portion of this book is devoted to a demonstration of the mechanical proceedings in the construction of statues of ivory, or of ivory and gold. These details are exceedingly interesting, both to the artist and to the mechanic. His theory is founded upon a consideration of the form of the elephant's tusk, partly hollow and partly solid,—upon the assumption that the ancients were able to obtain tusks of larger dimensions than those ordinarily seen at the present day,—that an art existed of rendering the cylindrical part of the tusk flat when cut through longitudinally,—and that plates might thus be procured from six to twenty-four inches wide. He then conceives that a block of wood having been fashioned as a sort of core for the ivory, the individual plates were fixed upon it, having been cut and polished in exact resemblance to the corresponding portions of a model previously executed. The following woodcuts exhibit (1) the clay model, (2) the separate pieces of ivory for a bust, and (3) the block with a portion of the ivory plated on it.



(1)



(2)



(3)

For fuller details of this subject generally, see the volume on the Elephant, in the 'Library of Entertaining Knowledge.'

STATISTICAL NOTES—(*Continued*).

THE CORN TRADE.

(41.) The importation of corn is a subject which must be considered with peculiar reference to the laws by which such importation is governed. The present corn law (the 9 Geo. IV. cap. 60) came into operation in 1828, and imposes a duty fluctuating according to the average price in this country. The scale of this duty may be judged of by quoting the following extracts from the scale for wheat:—

	Per Quarter.		
When the average price is not under 61*s.* and under 62*s.* per quarter, the duty is . . .	£1	6	8
When 62*s.* and under 63*s.*	1	4	8
" 69*s.* " 70*s.*	0	13	8
" 71*s.* " 72*s.*	0	6	8
" 72*s.* " 73*s.*	0	2	8
At or above 73*s.*	0	1	0

This law is a modification of a more prohibitory system which had been acted upon for some years, but it preserves the principle of the fluctuating scale of duties. Since it came into operation on the 15th July, 1828, up to the 30th of June, 1831, there have been imported in those three years 7,263,184 quarters of corn of every description, being an average of 2,421,061 quarters a year, and the total amount of duty collected upon corn in such three years was £2,096,951. The total quantity of foreign wheat imported in the same period was 4,620,029 quarters, being an average of 1,540,009 quarters a year, and the three years' duty amounted to £1,389,290, being after the rate of 6*s.* 1*d.* per quarter as the mean duty The annual consumption of corn in the United Kingdom, including what is used for seed, has been estimated as follows:—

	Wheat. Qrs.	Other Grain. Qrs.	Total. Qrs.
Year . . .	12,000,000 . . .	40,000,000 . . .	52,000,000
Month . .	1,000,000 . . .	3,333,333 . . .	4,333,333
Week . .	250,000 . . .	833,333 . . .	1,083,333
Day . . .	35,714 . . .	119,048 . . .	154,762

(42.) It appears that upon an average of the last three years the quantity of corn imported has been less than two million quarters and a half. But taking the import of the year 1818, viz., 3,522,729 quarters, being the largest quantity imported in any one year, and comparing it with the produce of the kingdom, it will be found to amount to about the fourteenth part of it. It is probable, however, that about half the corn produced is never brought to market, but is consumed by the agriculturists themselves, or used for seed, &c., so that it may be estimated that the quantity of foreign corn in the market has, at the utmost, not exceeded the seventh part of the British corn brought to market. This, however, would have a material influence in alleviating scarcity in a bad year, and checking the rise of prices. It has been doubted, however, whether these objects are attained under a fluctuating system of duties; and a fixed duty of 6*s.* to 7*s.* the quarter has been thought by some preferable to the existing scale, and that it would be a sufficient protection to agriculture.

(43.) Although the interests of agriculture are entitled to consideration, it must not be forgotten that whatever rise of the price of the corn consumed over that which it would otherwise cost is caused by the system of duties, is equivalent to a tax on the consumer to that amount. Now, every shilling duty upon the 52,000,000 quarters consumed is equivalent to a tax of £2,600,000; and estimating the average rise on all sorts of grain at 7*s.* per quarter, the total would be £18,200,000; and supposing one half to be consumed by the agriculturists, then the amount would be £9,100,000. Upon the corn laws in general it may suffice to remark that in all political measures, where there are conflicting interests, it is necessary often that each should give and take something for the general good of the whole; and if on

the one hand it is unfair in the consumer to object to the reasonable protection of the British agriculturist, it would, on the other, be no less censurable in the agriculturists for them to endeavour to separate their particular interest from the general good.

[To be continued.]

THE CAMEL.



[The Arabian Camel.]

OVER the arid and thirsty deserts of Asia and Africa, the camel affords to man the only means of intercourse between one country and another. The camel has been created with an especial adaptation to the regions wherein it has contributed to the comfort, and even to the very existence, of man, from the earliest ages. It is constituted to endure the severest hardships with little physical inconvenience. Its feet are formed to tread lightly upon a dry and shifting soil; its nostrils have the capacity of closing, so as to shut out the driving sand, when the whirlwind scatters it over the desert; it is provided with a peculiar apparatus for retaining water in its stomach, so that it can march from well to well without great inconvenience, although they be several hundred miles apart. And thus, when a company of eastern merchants cross from Aleppo to Bussora, over a plain of sand which offers no refreshment to the exhausted senses, the whole journey being about eight hundred miles, the camel of the heavy caravan moves cheerfully along, with a burden of six or seven hundred weight, at the rate of twenty miles a day; while those of greater speed, that carry a man, without much other load, go forward at double that pace and daily distance. Patient under his duties, he kneels down at the command of his driver, and rises up cheerfully with his load; he requires no whip or spur during his monotonous march; but, like many other animals, he feels an evident pleasure in musical sounds; and therefore, when fatigue comes upon him, the driver sings some cheering snatch of his Arabian melodies, and the delighted creature toils forward with a brisker step, till the hour of rest arrives, when he again kneels down, to have his load removed for a little while; and if the stock of food be not exhausted, he is further rewarded with a few mouthfuls of the cake of barley, which he carries for the sustenance of his master and himself. Under a burning sun, upon an arid soil, enduring great fatigue, sometimes entirely without food for days, and seldom completely slaking his thirst more than once during a progress of several hundred miles, the camel is patient, and apparently happy. He ordinarily lives to a great age, and is seldom visited by any disease.

Camels are of two species. That with one hump, which is represented with his ordinary pack-saddle in the wood-cut, is the Arabian camel, and is usually called the dromedary. The species with two humps is the Bactrian camel. The Asiatics and Africans distinguish as dromedaries those camels which are used for riding. There is no essential difference in the species, but only in the breed. The camel of the heavy caravan, the baggage camel, may be compared to the dray-horse; the dromedary to the hunter, and, in some instances, to the race-horse. Messengers on dromedaries, according to Burckhardt, have gone from Daraou to Berber in eight days, while he was twenty-two days with the caravan on the same journey. Mr. Jackson, in his account of the Empire of Morocco, tells a romantic story of a swift dromedary, whose natural pace was accelerated in an extraordinary manner by the enthusiasm of his rider · " Talking with an Arab of Suse,

on the subject of these fleet camels, and the desert horse, he assured me that he knew a young man who was passionately fond of a lovely girl, whom nothing would satisfy but some oranges; these were not to be procured at Mogadore, and, as the lady wanted the best fruit, nothing less than Marocco oranges would satisfy her. The Arab mounted his heirie at dawn of day, went to Marocco (about one hundred miles from Mogadore), purchased the oranges, and returned that night after the gates were shut, but sent the oranges to the lady by a guard of one of the batteries."

The training of the camels to bear burthens, in the countries of the East, has not been *minutely* described by any traveller. M. Brue, who, at the latter part of the seventeenth century, had the management of the affairs of a French commercial company at Senegal, says, "soon after a camel is born, the Moors tie his feet under his belly, and having thrown a large cloth over his back, put heavy stones at each corner of the cloth, which rests on the ground. They in this manner accustom him to receive the heaviest loads." Both ancient and modern authors agree tolerably well in their accounts of the load which a camel can carry. Sandys, in his Travels in the Holy Land, says, "six hundred weight is his ordinary load, yet will he carry a thousand." The caravans are distinguished as *light* or *heavy*, according to the load which the camels bear. The average load of the heavy, or slow-going camel, as stated by Major Rennell, who investigated their rate of travelling with great accuracy, is from 500 to 600lbs. Burckhardt says, that his luggage and provisions weighing only 2 cwt., and his camel being capable of carrying 6 cwt., he sold him, contracting for the transport of his luggage across the desert. The camel sometimes carries large panniers, filled with heavy goods; sometimes bales are strapped on his back, fastened either with cordage made of the palm-tree, or leathern thongs; and sometimes two, or more, will bear a sort of litter, in which women and children ride with considerable ease.

The expense of maintaining these valuable creatures is remarkably little: a cake of barley, a few dates, a handful of beans, will suffice, in addition to the hard and prickly shrubs which they find in every district but the very wildest of the desert. They are particularly fond of those vegetable productions which other animals would never touch, such as plants which are like spears and daggers, in comparison with the needles of the thistle, and which often pierce the incautious traveller's boot. He might wish such thorns eradicated from the earth, if he did not behold the camel contentedly browsing upon them; for he thus learns that Providence has made nothing in vain. Their teeth are peculiarly adapted for such a diet. Differing from all other ruminating tribes, they have two strong cutting teeth in the upper jaw; and of the six grinding teeth, one on each side, in the same jaw, has a crooked form: their canine teeth, of which they have two in each jaw, are very strong; and in the lower jaw the two external cutting teeth have a pointed form, and the foremost of the grinders is also pointed and crooked. They are thus provided with a most formidable apparatus for cutting and tearing the hardest vegetable substance. But the camel is, at the same time, organized so as to graze upon the finest herbage, and browse upon the most delicate leaves; for his upper lip being divided, he is enabled to nip off the tender shoots, and turn them into his mouth with the greatest facility. Whether the sustenance, therefore, which he finds, be of the coarsest or the softest kind, he is equally prepared to be satisfied with and to enjoy it.

ÆSCHINES.

To convey to a person unacquainted with the Greek language any accurate idea of the style of the great writers of Athens, is perhaps not an easy task; and certainly it is an undertaking that has seldom been successfully accomplished. The chief difficulty appears to be, that the reader cannot so far remove all his present associations as to transport himself into a new set of circumstances, and to figure to himself the social life and modes of thought that prevailed in a nation which existed more than two thousand years ago. If it is often difficult for an Englishman to comprehend the thoughts and expressions of foreign writers of his own time, as undoubtedly it often is, how much must the difficulty be increased when he endeavours to understand a writer of a remote age, living under a political and religious system entirely different from any thing existing at the present day? And if to this we add, that all the common books which treat of matters of antiquity only convey false impressions, it is no wonder if we see these untrue pictures reflected and even magnified on every occasion when they are pressed into service by the political speaker or the political writer.

Another defect in translation is the preference of fine words and rounded sentences to simple and unpretending language. It may be safely laid down as a general rule in translating from one language into another, that, if ever we desert simplicity of expression, we run the risk of impairing or altering the meaning of the original.

In the following specimen, taken from the opening of an oration of Æschines, we have attempted nothing more than to express in the plainest English the meaning of the speaker; and it will only require a few words of previous explanation to render the whole intelligible to any person. The skill of a practised speaker and writer (for we must bear in mind that these speeches were nearly always written before they were pronounced,) will easily be recognized in this opening address of Æschines.

Demosthenes and Æschines had formed part of a commission sent to treat with Philip of Macedon, the father of Alexander the Great, about the terms of a peace. After their return from the second embassy Demosthenes instituted a prosecution against Æschines for malversation in the mission, and for bribery and corruption. He sold the interests of his native city, as Demosthenes alleges, for Philip's gold. The speech of Demosthenes, which still remains, though perhaps not one of the best specimens of his skill, is still a highly laboured production, abounding in ingenious sophistry, and seasoned with that high tone of personal abuse and invective in which he was so accomplished a master. Æschines replied with no less art and ingenuity, and, as the story goes, escaped a conviction. It should be recollected that the accused had, according to general usage at Athens, to address a very numerous jury, whose vote was given by ballot, and whose opinion was decided by that of the majority.

"I pray you, Athenians, to listen to me with favour, considering the magnitude of my danger, and the variety of charges to which I must reply; considering, too, the arts and intrigues of my accuser, and his unfeeling temper. For he has been bold enough to tell you not to listen to the accused; *you*, who are bound by oath to give both parties a fair hearing. And it was not in the heat of passion that he said this, for no man when he is lying *can* feel anger against the person whom he is falsely accusing. Nor yet do those who speak the truth ever try to hinder the accused from making his defence; for we know that an accusation prevails not with those who are to judge till the accused has made his defence, and shown himself unable to answer the charge. But Demosthenes, I know, is not fond of fair discussion, nor does it form any part of his present policy: his design has been to rouse your passions, and therefore has he ventured to accuse me of corruption, *he* who can have no great weight in sustaining such a charge. When

a man tries to move your indignation against corruption, it is essential that he should be altogether free from the imputation himself.

"Never before has it been my lot to feel such alarm, to be moved with such indignation, nor yet to enjoy such unbounded satisfaction, as on the present day, while I have been listening to the speech of Demosthenes. I felt alarm, and indeed I do still feel apprehension, that some of you will hardly know me after being spell-bound and deceived by the insidious and malicious contrasts in which he has placed all my actions: I was almost beside myself with indignation, when I heard him accuse me of drunken brutal violence to a free woman of Olynthus: but I was delighted to see you stop him short in the midst of his abuse; and this I feel to be a full reward for my sober and blameless life.

"For this you deserve my thanks; and I am most especially pleased that you choose to judge of a man rather according to the whole tenor of his life, than from the charges of a malicious enemy. But still I shall not decline answering the imputation. If there is a single man in all the crowd around us—and I think we have pretty nearly all the citizens present—or if there is one individual of the jury ready to believe that I ever did so shameful a thing, were it even to a slave, I should not think my life worth preserving. And further, if I do not in the course of my defence prove the charge to be entirely false, and the man who has had the impudence to make it an unprincipled and malicious accuser, and if I do not acquit myself of blame in every other matter, let my sentence be—death. And, concerning the rest of the charges, I entreat you, my judges, if I pass over any thing and do not notice it,—question me and let me know what you wish to hear from me; not prejudging me, but listening fairly to both parties. And indeed I hardly know where to begin my defence, so irregular is the charge brought against me. And I beg you just to consider if I am put in a fair position. The man whose life is now at stake is *myself:* but the chief weight of the accusation is against Philocrates, Phryno, and the rest of the ambassadors, and against King Philip, and against the terms of the peace, and against the policy of Eubulus: and *I* am brought in on all these occasions. Demosthenes, it seems, according to his own account, is the only man who looks after the true interests of the state—all the rest are traitors.

"In replying to such impudence and marvellous knavery, it is difficult to recollect all the particulars of an accusation, and difficult too, when a man's life is at stake, to disprove such unexpected calumnies. But in order that my statement may be as clear as possible, and perfectly intelligible and fair, I will begin with the discussions about the peace, and the nomination of the ambassadors. Following this plan I shall be best able to recollect and to state the facts, and you will be best enabled to understand them."

ALBERT DURER.

Albert Durer, who was born at Nuremberg on the 20th of May, 1471, and died at the same place on the 6th of April, 1528, was equally eminent as a painter and as an engraver, and decidedly surpassed all his countrymen in both capacities during the age in which he flourished. In the history of early engraving, indeed, there is scarcely perhaps a greater name than his; and we shall take the opportunity of giving in connexion with it a short notice respecting that art.

Some writers are fond of carrying the origin of engraving to a very high antiquity, by quoting as examples of the practice of the art such carvings in wood or metal, or stone, as have been found in various degrees of excellence among almost all nations,—among our own Saxon and even British ancestors, as well as among the Egyptians, Greeks, and Romans. But this is to confound two things which are entirely distinct. Such works as those alluded to are specimens of sculpture, not of what we now call engraving. The modern art known by that name applies to the production of a print, or rather of a number of prints, from a design cut in wood or metal. The mere cutting out both of letters and of figures in a hard substance has been practised from the earliest ages; the art of obtaining letters and figures so cut out from copies or impressions by means of a colouring matter spread over them, and thence transferred to some other substance, is, in Europe at least, altogether a modern invention. The ancients were, indeed, accustomed to produce impressions by means of stamps in a variety of cases; they struck coins, they made seals in wax, they even marked the weight and quality on their loaves of bread with a stamp. On the other hand, they applied a coloured liquid to make marks, both in their painting, with a brush or pencil, and in writing, with a reed or other species of pen. What they did not do was just to use the two methods at once,—to take the impression from the stamp, not by making it enter into the substance of the material on which it was pressed, but only by making it communicate to that material a fluid colour. The principal cause undoubtedly which prevented the ancients, after advancing so far as they did, from discovering the art of printing, was the want of any general demand for books. A high price, it is true, was paid for books, and must have been paid, by the few who did buy them; the labour necessary for the copying of a manuscript was great, and a book therefore could not be obtained for a small sum. If there be an article which from its nature cannot be expected to ensure more than a very limited demand, let it be produced at what price it may, it is evident that in the case of that article the usual incentives are in great part wanting which excite the ingenuity of the manufacturer to endeavour, as in all other cases, to find out the cheapest way of producing it. Now, in Greece and Rome, and also throughout the middle ages, this appears to have been nearly the case with books. Very large prices were obtained for manuscripts upon which much labour had been bestowed; but the number of purchasers was extremely limited: and from the state of the general population it was scarcely to be expected that a reduction of price would ensure any considerable extension of the market.

It was the general demand for the Bible, or rather perhaps for religious manuals of various descriptions, which first altered this state of things; and, to that cause therefore we owe the art of printing, whether as regards printing from moveable types, or from blocks of wood, or from metal plates. The step from what had been already done to the completion of this great invention was so immediate and easy, that we seem to be quite warranted in accounting for its not having been made sooner, simply from the absence of any strong inducement to make it. There was no one book of which more than a few dozen copies were actually sold, or could reasonably be expected to be sold, at any such moderate reduction of price as the application of more ingenuity to the manufacture was likely to allow; such application therefore was not thought of. But when, in the early part of the fifteenth century, after the several nations of Europe had settled down, and as it were ripened into something like social organization, and the revival of classical learning had spread abroad over the community a much more general scholarship than before existed, the demand grew up not merely among the clergy, but to a great extent among the laity also for the Latin Scriptures, and other devotional works. A state of things then for the first time presented itself, in which it might be considered certain, that a reduction of price would bring with it a large extension of the market. In the case of one class of books, at least, this was sure

to follow; and religious books accordingly were the first to which the new art was applied.

The art of printing would probably of itself have speedily led to that of engraving; but in point of fact, it would rather appear that the latter had a distinct origin of its own. As the general demand for the Bible prompted the one invention, so a general demand of a very different kind, that, namely, for playing-cards, seems to have previously suggested the first idea and application of the other. Playing-cards were certainly known in Germany before the year 1376. It is probable that they were at first painted individually by the hand, as books were written; and the more expensive sorts may have long continued to be prepared in this way. But it appears certain, that the makers at length began to stamp them from blocks, probably of wood, when they had come into general use. Here, then, was what we now call wood-engraving invented and put in practice. In this process, as in letter-press printing, the mark is made upon the paper by the raised parts of the stamp, or rather by those which are not cut away; the scooped-out parts receiving no ink, and of course transmitting none to the paper. The method of printing from a wood-cut, therefore, is exactly the same with that of printing from ordinary types; and the two can be accordingly combined in the same page. Wood-cuts were introduced into books very soon after the invention of printing. The process of copper-plate printing proceeds upon a different principle. In the copper, the parts which are to receive the ink and make the impression are cut out, either in lines or dots, and the surface of the metal which remains raised leaves no mark. To prevent it therefore from retaining any ink, this surface has to be carefully rubbed dry after every impression, and only the ink which is in the hollows of the plate allowed to remain. This makes copper-plate printing an exceedingly tedious operation, and also one which cannot be combined with that of letter-press. These repeated rubbings, too, very soon wear out the plate; but this last disadvantage has of late years been completely obviated by the substitution of steel for copper, in every department of metallic engraving where large numbers of impressions are required. When in steel or copper engraving, the dark parts of the picture are cut out in lines, the process is called line-engraving; when in dots, it is called dot-engraving, or stippling. In both, the shades are made lighter or deeper by the lines or dots being kept more or less apart. Frequently, however, these marks are not made by a cutting-tool, but by the method called *etching*, which consists in the application of aqua-fortis, or some other acid, to bite into the metal. In nearly all plates etching is the first step in the process. The surface of the plate is spread over with a composition or varnish which is not affected by the action of the acid; to this the design intended to be engraved is transferred, either by being drawn upon it (in reverse of course) with the hand, or by its outlines, traced with a black lead pencil, being at once impressed upon the composition by passing it through the rolling-press. The varnish, or ground, as it is called, is then carefully cut away down to the copper, wherever it is thus marked. After this the aqua-fortis is poured over the whole, and kept standing upon it by a rim of wax erected around the plate, until it is considered to have eaten deep enough into the copper at those places from which the varnish has been removed. The lines thus formed, however, frequently receive a finishing touch from the graver; and one part of a plate is often wholly cut by the graver, while another part not requiring the same delicacy of touch is done by the easier method of etching. Albert Durer has been usually stated to have been the inventor of etching; and he was undoubtedly the person by whom it was first brought to any degree of perfection. Lastly, there is the process, commonly called among us mezzotinto-engraving (that is, half-painting, from the effect it produces being conceived to resemble that of colours), but by foreigners the black manner, or sometimes the English manner. Its invention has been ascribed to Prince Rupert; but it was practised by others before him, and it is now generally allowed that we are indebted for it to a German military officer, of the name of Siegen, or Sichem. The whole surface of the plate is first made rough and raised up by being, as it were, repeatedly harrowed in various directions by an instrument called the grounding-tool, adapted to that purpose. All that has then to be done is to bruise down and smooth with the burnisher those places which are to represent the bright or less shaded parts of the design, the smoothing being made partial or complete according as more or less shade is necessary.

COCOA.

In consequence of a diminution in the duty on cocoa, a very nutritious and cheap article of food is now placed within the reach of almost all classes of persons, and a short account of it may be acceptable to our readers.

The cocoa, or cacao, is known to botanists under the name of *Theobroma cacao*, Linnæus having given it the first appellation to designate its excellent qualities, *Theobroma*, signifying "food for a god." The same naturalist placed it in the class *Monadelphia decandria* (i. e. having ten stamens, united into a tube round the pistil); but later authors refer it to the natural family of the *Malvaceæ* (mallows), most of the genera of which are highly useful to man.

The cacao is a native of South America, where it was not only used for food, but the seeds served as money. The tree is not unlike that of the cherry in form, and seldom exceeds twenty feet in height. The leaves are oblong, and pointed at the end, and when young are of a pale red. The flowers, which generally spring from the wood of the large branches of the tree, are small, and of a light red colour, mixed with yellow; the pods which succeed them are oval, and are green when young, but as they ripen they become yellow or red. They are filled with a sweet, white pulp, which surrounds the many seeds contained in each of the five cells, or divisions. When travelling, the native Indians eat this pulp, and find it very refreshing. The seeds are steeped in water previous to their being sown, and lose the power of reproduction in a few days after they are taken from the pod. As the plant grows up, the shade of the coral-tree is considered so essential, that it is called by the Spaniards the *Madre del cacao*, or mother of the cocoa. When this tree is covered with its bright scarlet blossoms it presents a splendid appearance.

It appears that there are two varieties of the cocoa in Trinidad, to which colony, and that of Grenada, the English plantations are now chiefly confined; the one variety is called the Creole cocoa, which is by far the best, but not so productive as the other sort, which has nearly superseded it, and bears the name of *Forastero*, or foreign. The former suits the Spanish market best, the latter having a somewhat bitter taste. The Creole begins to bear after about five years' growth, but does not reach perfection till the eighth year; it, however, yields good fruit for twenty years. The *Forastero* produces fruit at three years, and both, probably, come from the Spanish Main. It was formerly the practice in Trinidad to grant manumission to every slave who could at any time deliver up to his master one thousand cocoa-trees, planted by himself, in a space expressly allotted to them, in a state of bearing. Many instances of freedom obtained in this way might be cited, as the cultivation of them at any time did not infringe too much upon the daily tasks, and where nature had already provided shade and moisture, was comparatively trifling. In Grenada the plantations are beautifully situated among the mountains, and the labourers can work at

all hours in the shade; but the cocoa walks are now chiefly cultivated by free coloured people, most of whom are settlers from the Spanish Main.



[Leaf, flower, and fruit of the Cacao, with a pod opened.]

The seeds of the cocoa-tree are gathered twice every year, but the largest crop is yielded in the month of December; the other is ready in June. When picked, and extracted from the pods, they are placed in heaps, on platforms of clay, where they are suffered to ferment for forty-eight hours or more; they are then dried in the sun, exactly imitating the process used with coffee. When required for use, they are roasted till the husks may be readily taken off; and if to be converted into chocolate, they are bruised and worked with the hand into a paste, which is afterwards made still finer by a smooth iron. This is afterwards flavoured with various ingredients, the principal of which are cinnamon and vanilla; the latter is a climbing plant, indigenous to Trinidad, and bears long slender pods. A great consumption of chocolate takes place in Spain, where it is considered as a necessary of life. In France it is also much used, and is fashioned into an endless variety of forms.

When the seeds are to be made into cocoa they are ground to a fine powder. The husks, boiled in milk, make a thin and delicious beverage, and are in great request in France, for delicate persons who find the paste or powder too rich for them.

An excise duty on chocolate, and heavy duties on cocoa, have hitherto prevented any great consumption of these two articles in England, and the principal demand for the latter has hitherto been in the navy, each sailor's allowance being an ounce per diem, which affords him a pint of good liquid. The late reduction of duty will probably bring cocoa into more general use, as it is now half the price of coffee, and one-fifth that of tea, and certainly far more nutritious than either.

GENERAL EDUCATION.

IN an article in the Quarterly Journal of Education, No. X., just published, is given the following outline of a proposed course of instruction for the children of the poorer classes:—

Besides reading, writing, and arithmetic, the following subjects ought to be taught:

Reading ought to be united with *history*. The best and first history, of course, is that of the pupil's native country, which should be written, we need hardly say, very differently from any book of the class yet published. A school library, stored with useful books, might afford inestimable advantages. And why should England see her labours for promoting knowledge and enlightening mankind, turned to a better account in other countries than in her own?

To *writing*, i. e. calligraphy and orthography, should be added lessons on the *general principles* and nature of *language*.

Elementary drawing, which has been so often recommended, should certainly be a part of the education of all classes. It might be confined to the slate, and consist in teaching to draw straight and curved lines, with regular figures, accompanied by drawings composed of these lines and figures; and, finally, the pupil should draw various real objects. This branch of drawing proceeded from, and is cultivated in, Pestalozzian schools.

The copying of pattern drawings and objects of nature must be chiefly left to the taste and opportunities of every individual pupil. The symmetrical figures, or compositions expressing merely symmetry—such as architectural ornaments, patterns of vessels, furniture, &c. need only be drawn on slates during the lesson, and may afterwards be copied at home into books with lead pencil, by those who show any taste and wish for it; and their books might occasionally be brought to school for the inspection of the master. There is little doubt that those, who, after leaving school, enter trades may derive the greatest advantages from those lessons of drawing, which develope and cultivate a taste for beauty and symmetry of form. Such practice would, undoubtedly, soon have a beneficial effect on all great branches of our national industry, where the taste of the workman is called into action.

Geography, at least that of their own country, and in the upper classes a general description of the globe, ought to be taught in all schools, with the aid of maps, &c., accompanied in each case with an account of the natural and manufactured products which characterize each country.

Arithmetic is indispensable; and some elements of *Geometry* might be given in the drawing lesson.

Music also should be taught. The objection, that this is impracticable, because English boys, generally speaking, possess no ear for music, is quite groundless; for experience in a sufficient number of instances to warrant a general rule, has proved the contrary to be the case. English boys are naturally quite as musical as German and French boys, and in Germany singing is taught in every school. Music was generally cultivated in England at one time, and it will again become general, and increase content and happiness, when the condition of the poorer classes will allow them a little more comfort and rational enjoyment than they now possess.

Religious and *moral instruction* need not be particularly specified here; it is that on which the success of all other instruction chiefly depends.

By what means the general instruction of the lower classes can be effected to the extent here briefly pointed out, is a question which belongs to the government to answer, and we hope they will soon speak out. This much may be said, that in the immense resources, and in the liberality and charitable character of the English nation, there will be found sufficient means for establishing a school in every village, throughout England and Wales, conducted on a plan similar to those in Germany, and particularly in Prussia. Parents ought to pay a trifle to prevent their undervaluing that which they can have for nothing. Boys ought to be compelled to attend these schools regularly, at least, to their fourteenth, girls to their thirteenth, year. No one who knows the English character will doubt that, if these village schools once obtained general esteem, there would be no want of exhibitions and prizes, &c. to enable the boy, who showed distinguished abilities and a good character, to go to a grammar school, and if he conducted himself well, to obtain any honour and advantages which education can confer.

₊ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

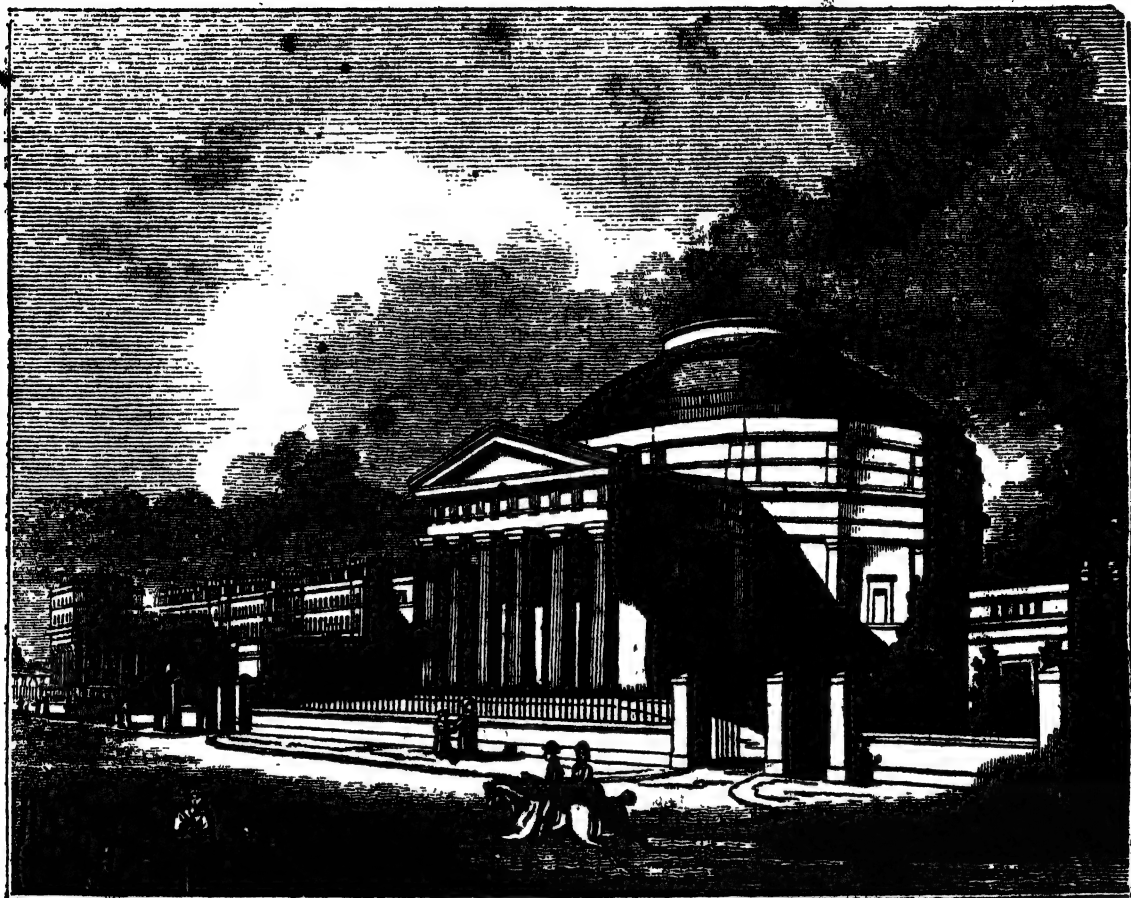
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THE COLOSSEUM.



[The Colosseum, in the Regent's Park, London.]

The above wood-cut represents a remarkable building in the Regent's Park, erected somewhat more than four years ago, chiefly for the purpose of exhibiting a panorama of London. It is called after the Colosseum of Rome; to which monument of ancient magnificence, however, it does not bear the slightest resemblance.

The origin of this edifice is singularly curious. Mr. Horner, a meritorious and indefatigable artist, and as it should seem a man of great force of character, undertook, at the time of the repair of the ball and cross of St. Paul's, to make a series of panoramic sketches of London, from that giddy elevation. That he might overcome the difficulties which the smoke of the vast city ordinarily presented, he invariably commenced his labours immediately after sun-rise, before the lighting of the innumerable fires which pour out their dark and sullen clouds during the day, and spread a mantle over this wide congregation of the dwellings of men, which only midnight can remove. On a fine summer morning, about four o'clock, London presents an extraordinary spectacle. The brilliancy of the atmosphere—the almost perfect stillness of the streets, except in the neighbourhood of the great markets—the few living beings that pass along those lines which in the day are crowded like some vast mart, such as the traveller hurrying to his distant starting-place, or the labourer creeping to his early work—all these circumstances make up a picture which forcibly impresses the imagination. Wordsworth has beautifully painted a portion of this extraordinary scene in one of his finest sonnets:—

"Earth has not any thing to show more fair:
Dull would he be of soul who could pass by
A sight so touching in its majesty:
This city now doth like a garment wear
The beauty of the morning; silent, bare,
Ships, towers, domes, theatres, and temples lie
Open unto the fields, and to the sky;
All bright and glittering in the smokeless air.
Never did sun more beautifully steep
In his first splendour valley, rock, or hill;
Ne'er saw I, never felt, a calm so deep!
The river glideth at his own sweet will:
Dear God! the very houses seem asleep;
And all that mighty heart is lying still!"

The freedom from interruption—the perfect loneliness in the heart of the busiest spot on earth—give to the contemplative rambler through London, at the "sweet hour of prime," a feeling almost of fancied superiority

over the thousands of his fellow-mortals whose senses are steeped in forgetfulness. But how completely must Mr. Horner have felt this power, in his "lofty aëry!" Did the winds pipe ever so loud, and rock him to and fro in his wicker-basket, there he sat in security, intently delineating what few have seen—the whole of the splendid city—its palaces and its hovels, its churches and its prisons—from one extremity to the other, spread like a map at his feet. Gradually the signs of life would be audible and visible from his solitary elevation;—the one faint cry of the busy chapman swelling into a chorus of ardent competitors for public patronage—the distant roll of the solitary waggon, echoed, minute after minute, by the accumulation of the same sound, till all individual noise was lost in the general din—the first smoke rising like a spiral column into the skies, till column after column sent up their tribute to the approaching gloom, and the *one* dense cloud of London was at last formed, and the labours of the painter were at an end. These were the daily objects of him who, before the rook went forth for his morning flight, was gazing upon the most extensive, and certainly the most wonderful, city of the world, from the highest pinnacle of a temple which has only one rival in majesty and beauty. The situation was altogether a solemn and an inspiriting one;—and might well suggest and prolong that enthusiasm which was necessary to the due performance of the extraordinary task which the painter had undertaken.

What the artist who sketched this panorama saw only in the earliest hours of a brilliant morning, the visitor of the Colosseum may behold in all seasons, and all hours of the day. Upon the interior of the outer wall, which rises to a height of about seventy feet, is spread the panoramic view of London, embracing the most minute as well as distant objects. The spectator ascends a flight of steps in the centre of the building, till he arrives at an elevation which corresponds in size and situation with the external gallery which is round the top of the dome of St. Paul's. Not many persons can reach this situation at the cathedral, for the ascent is perilous, by dark and narrow ladders, misappropriately called staircases, amidst the timbers which form the framework of the dome. At the Colosseum the ascent is safe and easy; and the visitor who pays an extra price may be raised by machinery. Upon arriving in the gallery the spectator is startled by the completeness of the illusion. The gradations of light and colour are so well managed, that the eye may range from the lower parts of the cathedral itself, and the houses in its immediate neighbourhood, over long lines of streets, with all their varieties of public and private buildings, till it reposes at length upon the fields and hills by which the great metropolis is girt. The amplitude of the crowded picture is calculated to impress the mind with a sense of surprise, not unmixed with those feelings which belong to the contemplation of any vast and mysterious object.

"How rich, how poor, how abject, how august,
How complicate, how wonderful, is" London.

How the whole town is filled with the toil and turmoil of commerce. Turn to the right, the struggle is there going forward; turn to the left, it is there also. Look from the west to the east, and let the eye range along the dark and narrow streets that crowd the large space from Cheapside to the Thames—all are labouring to fill their warehouses with the choicest products of the earth, or to send out fabrics to the most distant abodes of civilized or even of uncivilized life. Look, beyond, at the river crowded with vessels, and the docks where masts show like a forest. In all this going to and fro of the sons of commerce, and in this incessant din of barter and brokerage, there is much throwing away of the best energies of man, and many painful exhibitions of the inequalities of fortune. But assuredly the activity of trade is a better thing than the activity of war. It is for us to subdue the earth by an interchange of benefits, and thus does the energy of commerce carry the seeds of knowledge and taste into the most distant regions. Count not, therefore, these cranes and waggons, and "the din of all this smithery," as vulgar things. They are accomplishing the purposes of Providence, slowly and surely; and when we have done our work other nations will, in the same way, roll forward the ball of civilization.

The principal reason why England is so much in advance of other nations in her manufacturing and commercial industry, arises from the prodigious accumulations, of which London furnishes the most splendid example. Recollect what the vast city, whose modern state we see mapped out at the Colosseum, was five hundred or even two hundred years ago. Three-fourths of the space now covered by houses was occupied by fields in the reign of Elizabeth; one bridge only crossed the Thames instead of six; not a dock then existed; the steam-engine, which during the last half-century has made London a great manufacturing town, was unknown; the streets were unpaved; the houses were unsupplied with water; there were few schools for general education; the splendid hospitals and other institutions for the relief of suffering, which are the glory of London, remained to be established; there was no post office; and scarcely a public conveyance to ply through the miry streets. Compare this state of things with the present condition of the metropolis, and see how all the best possessions of civilization have been gradually accumulated, and what advantages we possess in the accumulation. These advantages, not peculiar to London, but exhibited in the same degree, though on a smaller scale, by every portion of the country, constitute a part, as it were, of the public property of the humblest individual. We may illustrate this by some remarks contained in the little work on 'Capital and Labour,' published by the Society.

"It may assist us in making the value of capital more clear, if we take a rapid view of the most obvious features of the accumulation of a highly civilized country.

"The first operation in a newly-settled country is what is termed to clear it. Look at a civilized country, such as England. It *is* cleared. The encumbering woods are cut down, the unhealthy marshes are drained. The noxious animals which were once the principal inhabitants of the land are exterminated; and their place is supplied with useful creatures, bred, nourished, and domesticated by human art, and multiplied to an extent exactly proportioned to the wants of the population. Forests remain for the produce of timber, but they are confined within the limits of their utility;—mountains "where the nibbling flocks do stray," have ceased to be barriers between nations and districts. Every vegetable that the diligence of man has been able to transplant from the most distant regions is raised for food. The fields are producing a provision for the coming year; while the stock for immediate consumption is ample, and the laws of demand and supply are so perfectly in action, that scarcity seldom occurs and famine never. Rivers have been narrowed to bounds which limit their inundations, and they have been made navigable wherever their navigation could be profitable. The country is covered with roads and with canals, which render distant provinces as near to each other for commercial purposes as neighbouring villages in less advanced countries. Houses, all possessing some comforts which were unknown even to the rich a few centuries ago, cover the land, in scattered farm-houses and mansions, in villages, in towns, in cities, in capitals. These houses are filled with an almost inconceivable number of conveniences and luxuries—furniture, glass, porcelain, plate, linen, clothes, books, pictures. In the stores of the merchants and traders, the resources of

human ingenuity are displayed in every variety of substances and forms that can exhibit the multitude of civilized wants; and in the manufactories are seen the wonderful adaptations of science for satisfying those wants at the cheapest cost. The people who inhabit such a civilized land have not only the readiest communication with each other by the means of roads and canals, but can trade by the agency of ships with all parts of the world. To carry on their intercourse amongst themselves they speak one common language, reduced to certain rules, and not broken into an embarrassing variety of unintelligible dialects. Their written communications are conveyed to the remotest corners of their own country, and even to other kingdoms, with the most unfailing regularity. Whatever is transacted in such a populous hive, the knowledge of which can afford profit or amusement to the community, is recorded with a rapidity which is not more astonishing than the general accuracy of the record. What is more important, the discoveries of science, the elegancies of literature, and all that can advance the general intelligence, are preserved and diffused with the utmost ease, expedition, and security, so that the public stock of knowledge is constantly increasing. Lastly, the general well-being of all is sustained by laws,—sometimes indeed imperfectly devised and expensively administered, but on the whole of infinite value to every member of the community; and the property of all is defended from external invasion and from internal anarchy by the power of government, which will be respected only in proportion as it advances the general good of the humblest of its subjects, by securing their capital from plunder and defending their industry from oppression.

"When we look at the nature of the accumulated wealth of society, it is easy to see that the poorest member of it who dedicates himself to profitable labour is in a certain sense rich—rich, as compared with the unproductive and therefore poor individuals of any uncivilized tribe. The very scaffolding, if we may so express it, of the social structure, and the moral forces by which that structure was reared, and is upheld, are to him riches. To be rich is to possess the means of supplying our wants—to be poor is to be destitute of those means. Riches do not consist only of money and lands, of stores of food or clothing, of machines and tools. The particular knowledge of any art,—the general understanding of the laws of nature,—the habit from experience of doing any work in the readiest way,—the facility of communicating ideas by written language,—the enjoyment of institutions conceived in the spirit of social improvement,—the use of the general conveniences of civilized life, such as roads—these advantages, which the poorest man in England possesses or may possess, constitute individual property. They are means for the supply of wants, which in themselves are essentially more valuable for obtaining his full share of what is appropriated, than if all the productive powers of nature were unappropriated, and if, consequently, these great elements of civilization did not exist. Society obtains its almost unlimited command over riches by the increase and preservation of knowledge, and by the division of employments, including union of power. In his double capacity of a consumer and a producer, the humblest man has the full benefit of these means of wealth—of these great instruments by which the productive power of labour is carried to its highest point.

"But if these common advantages, these public means of society, offering so many important agents to the individual for the gratification of his wants, alone are worth more to him than all the precarious power of the savage state,—how incomparably greater are his advantages when we consider the wonderful accumulations, in the form of private wealth, which are ready to be exchanged with the labour of all those who are in a condition to add to the store. It has been truly said, 'it is a great misfortune to be poor, but it is a much greater misfortune for the poor man to be surrounded only with other poor like himself.' The reason is obvious. The productive power of labour can be carried but a very little way without accumulation of capital. In a highly civilized country, capital is heaped up on every side by ages of toil and perseverance. A succession, during a long series of years, of small advantages to individuals unceasingly renewed and carried forward by the principle of exchanges, has produced this prodigious amount of the aggregate capital of a country whose civilization is of ancient date. This accumulation of the means of existence, and of all that makes existence comfortable, is principally resulting from the labours of those who have gone before us. It is a stock which was beyond their own immediate wants, and which was not extinguished with their lives. It is our capital. It has been produced by labour alone, physical and mental. It can be kept up only by the same power which has created it, carried to the highest point of productiveness by the arrangements of society."

ADMIRAL LORD VISCOUNT EXMOUTH.

The recent death of Admiral Lord Viscount Exmouth, which took place at his house at Teignmouth on the 23d of January last, induces us to devote a small part of our space to a notice of the professional career of one of the best men and ablest officers of whom our naval service has ever had to boast. We shall avail ourselves for this purpose of a memoir of his lordship, which appeared in the last number of the United Service Journal, from the pen of one who, during an intimate connexion of many years, enjoyed peculiar opportunities of observing both the method of his every-day life, and his conduct in extraordinary emergencies.

The father of Lord Exmouth, whose name was Samuel Pellew, commanded the Government Packet-Boat at Dover, where his son Edward was born on the 19th of April, 1757. The boy went to sea at the age of thirteen, having lost his father five years before. The ship in which he began his career was the Juno frigate, and his first voyage was to the Falkland Islands, at the extremity of South America. He was not engaged in active service till 1776, on the breaking out of the American war, when being sent out as midshipman in the Blonde frigate to Lake Champlain, he greatly distinguished himself in the course of that and the following year. The gallantry which he displayed on various occasions, obtained acknowledgments in the most flattering terms, both from Lord Howe and General Burgoyne, the former of whom also gave him a lieutenant's commission. On the surrender of the British force, after the battle of Saratoga, he returned on his parole to England, and was soon after appointed first lieutenant of the Apollo frigate, under Captain Pownoll. In the midst of an action, fought in the spring of 1780, the Captain fell wounded in Lieutenant Pellew's arms, who thereupon assumed the command of the ship, and soon compelled the enemy to take safety in flight. For his conduct on this occasion, he was promoted to the command of the Hazard sloop of war, from which, in March 1782, he was removed to the Pelican. A few months after he was raised by Admiral Keppel to the rank of post captain, for a very spirited attack, near the Bass Rock in the Frith of Forth, on three of the enemy's privateers, all of which he drove on shore. The following ten years he spent partly afloat at various stations, and in the command of different ships, and partly at home.

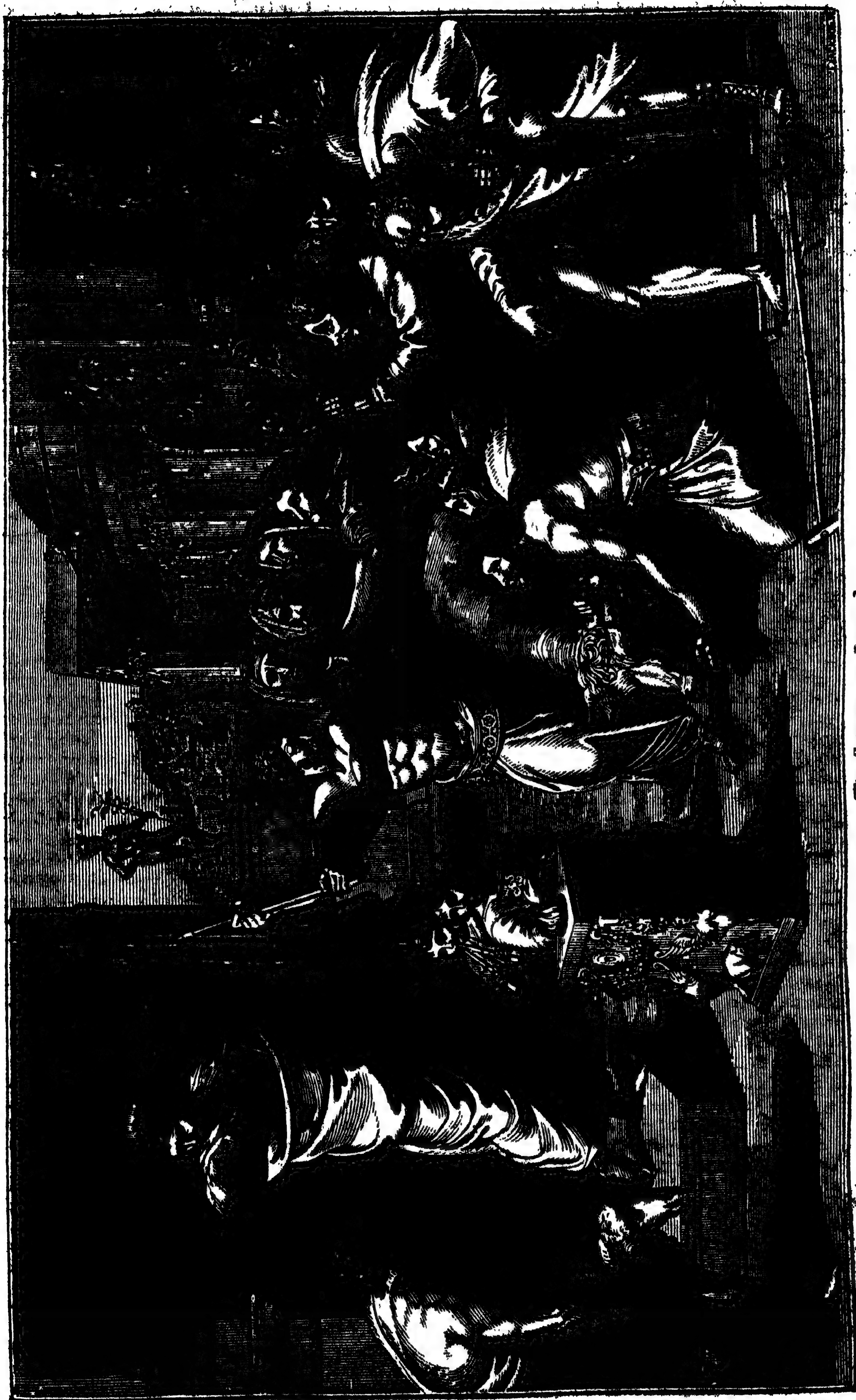
On the breaking out of the war of 1793, he was appointed to the command of the frigate La Nymphe, of thirty-six guns, in which he sailed from Falmouth on the 17th of June, and the next day captured the French

ship La Cléopatre, after a sharp struggle. For this achievement he received the honour of knighthood. It was followed by many other successful exploits, the enumeration of which we must omit. The following paragraph, however, of the memoir before us is too interesting not to be quoted at length. "But chiefly," says the writer, "as his conduct in command was entitled to distinction, nothing gained him more deserved honour than that union of prompt resolution with constitutional philanthropy which personally endeared him to his followers. Twice already, when captain of the Winchelsea frigate, this heroic spirit had been signally displayed by his leaping from the deck, and thus saving two of his drowning sailors. A more conspicuous example of this noble feeling was shown on the 26th January, 1796, when, by his great personal exertions, he preserved the crew and passengers of the Dutton transport, which, crowded with troops and their families, proceeding on the expedition to the West Indies, was driven on the rocks under the citadel at Plymouth. The writer of this slight memoir cannot refuse his readers the pleasure of seeing the hero's own modest account of this act of benevolence, contained in a private letter which he received from him many years afterwards (1811), when commander-in-chief in the North Seas. 'Why do you ask me to relate the wreck of the Dutton? Susan (Lady Exmouth) and I were driving to a dinner party at Plymouth, when we saw crowds running to the Hoe, and learning it was a wreck, I left the carriage to take her on, and joined the crowd. I saw the loss of the whole five or six hundred was inevitable without somebody to direct them, for the last officer was pulled on shore as I reached the surf. I urged their return, which was refused; upon which I made the rope fast to myself, and was hauled through the surf on board, established order and did not leave her until every soul was saved but the boatswain, who would not go before me. I got safe, and so did he, and the ship went all to pieces; but I was laid in bed for a week by getting under the mainmast (which had fallen towards the shore); and my back was cured by Lord Spencer's having conveyed to me by letter his Majesty's intention to dub me baronet. No more have I to say, except that I felt more pleasure in giving to a mother's arms a dear little infant only three weeks old, than I ever felt in my life; and both were saved. The struggle she had to entrust me with the bantling was a scene I cannot describe, nor need you, and consequently you will never let this be visible.'" This letter was communicated to no one, till after the death of the writer. From this time, till the peace in 1802, Sir Edward was employed in active service, and shared largely in the success which attended the naval arms of his country. On coming home after the peace he was returned to Parliament as member for Barnstaple. The resumption of hostilities, however, soon called him again abroad. In 1804 he was sent to take the chief command on the East-India station, in the Culloden of seventy-four guns; and here he remained till 1809, when he had attained the rank of Vice-Admiral. A few months after his return to England, he was again sent out as commander-in-chief of the fleet then blockading the Scheldt, and assisted in various operations of importance till the peace of 1814. Among the promotions which were made on that occasion, Admiral Pellew was elevated to the peerage by the title of Baron Exmouth, with a pension of £2000 per annum. He also received the riband of the Bath, and a year after, the Grand Cross of that order. On the escape of Napoleon his services were again employed, and he was sent out in command of a squadron to the Mediterranean. From this station, in the beginning of the year 1816, he proceeded, by order of the government, to Algiers, and obtained from the Dey a promise to liberate all the subjects of the allies who were detained by him in slavery. Most of our readers will recollect the manner in which this engagement was disregarded by the African sovereign as soon as the British ships had left his coast, and the brilliant success which attended the expedition that was immediately sent out under Lord Exmouth's command to compel him to perform his stipulations. Twelve hundred Christian slaves were by this exploit restored to liberty. The dignity of Viscount was the well-merited reward which Lord Exmouth received for the important service which he had rendered to his country and to Christendom. The following year the chief command at Plymouth was conferred on him for the usual period of three years; and at the conclusion of that term, having now attained the age of sixty-three, he retired into private life, passing the greater part of his time at his beautiful residence at Teignmouth. "There," says the writer before us, "while enjoying repose in the bosom of his own family, he looked back on the chequered scene of his former services with unmingled gratitude for all the dangers he had escaped—all the mercies he had experienced—and all the blessings he enjoyed. Retired from the strife and vanity of the world, his thoughts were raised with increasing fervour to Him who had guarded his head in the day of battle, and had led him safely through the hazards of the pathless sea. No longer harassed by the cares and responsibility of public service, religion, which he had always held in reverence, now struck deeper root in his heart; and nothing was more gratifying to the contemplation of his family and his most attached friends than the Christian serenity which shed its best blessings on his latter days."

THE CARTOONS OF RAFFAELLE.—No. 4.

THE SACRIFICE AT LYSTRA.

The man cured by St. Paul at Lystra had never walked, having been a cripple from the hour of his birth. His conversion, it would appear, had preceded this signal benefit. He had been listening to the discourse delivered by the apostle, "who steadfastly beholding him, and perceiving that he had faith to be healed, said with a loud voice, Stand upright on thy feet! and he leaped up, and walked." This evidence of supernatural power, exhibited before the eyes of the whole city, might have been expected to produce an immediate conviction of the divine origin of the new faith. The effect, however, was different: the miracle was indeed not only admitted, but followed by a burst of religious enthusiasm; but the acknowledgment of superhuman interposition was transferred by the pagans to their own deities, and Paul and Barnabas were saluted, not as the apostles of Christ, but as Mercury and Jupiter. "And the priests of Jupiter brought oxen and garlands unto the gates, and would have done sacrifice with the people." Raffaelle, whose imagination, although regulated by the most rigid accuracy of judgment, was sensitively alive to the *picturesque*, has availed himself of this point in the narrative, to produce a composition strikingly varied and beautiful. The unostentatious acts of the apostles are here mixed up with the pompous rituals of heathen superstition. The priests bending in solemn devotion, the inferior ministers engaged in the act of sacrifice, the victim sheep and oxen, the beautiful children who officiate at the altar,—these objects, in all their varieties of action, character, and costume, present so rich a combination of materials as would perhaps, in the hands of any other painter, have encumbered the effect, and distracted the attention. Throughout the cartoon, however the unity of the subject is completely preserved. Paul and Barnabas are immediately distinguished, not only by the general attention being directed towards them, but by nobility of mien and action. They stand also on an elevated plane, and are separated by a considerable interval from the tumultuous crowd which approaches them. Raffaelle's first object, in all his works, is the



[The Sacrifice at Lystra.]

clear development of his story, which is sometimes more effectually accomplished by departing from than adhering to the literal fact. He never loses sight, however, of any leading point in the text; and as the apostles are described on this occasion to have "run in among the people," he has shown another disciple who forces his way through the crowd, protesting vehemently against the impious ceremony, and endeavouring to arrest the arm of the executioner, which is uplifted to strike the victim. The energetic action of these figures contrasts finely with the still and solemn air of the priests; the whole composition, indeed, is admirably balanced with alternations of action and repose. But the main point to be impressed on the spectator was the miraculous cure. This is accordingly done with surprising force and perspicuity. At the right extremity of the cartoon appears the man who has been healed; his figure inclines to tallness, and he is well-formed throughout; his legs, in particular, are muscular and symmetrical. By what artifice then has the painter so clearly expressed that this is the cripple who was lame from his birth?—Impelled by emotion too big for utterance, with extended arms, pressed hands, and every demonstration of enraptured gratitude, he rushes forwards towards the apostles. His crutches, now useless, are thrown on the ground, and there is in his person no evidence of his former unhappy condition, except in that cast of features peculiar to deformed persons. He is surrounded by individuals anxious to assure themselves of the truth of the miracle by ocular inspection. An aged man, whose habit and aspect announce him to be a person of rank and authority, with a mingled air of curiosity and reverential awe, lifts the garment from the limb which has been healed, while his other hand is at the same time uplifted in astonishment at the incontestable proof before him. The same sentiment is expressed, with characteristic discriminations, among other persons in the group.

It is said by the commentators on the Cartoons, that St. Paul is rending his garments in horror of the sacrilegious rite about to be performed. It never appeared to us that this was the action intended by Raffaelle, the violence of which would have ill accorded with that apostolical dignity which he was always careful to preserve. We rather think that he meant the apostle to be giving utterance to the exclamation which he used on this occasion, "We are also men, with passions like unto yourselves;" and baring his breast in attestation of his humanity. St. Barnabas, who stands behind, gives thanks to God for the miraculous manifestation of his power.

Nothing perhaps in this cartoon fixes attention more strongly than the beauty of the two children at the altar; the one sounding musical instruments, the other holding a box of incense. Vacant, happy, and absorbed in their employment, they scarcely seem conscious of the events which are passing before them. No artist perhaps ever approached Raffaelle in the delineation of infantine innocence and simplicity.

That part of the composition comprised in the sacrifice was drawn by Raffaelle from an antique basso-relievo. His known wealth was such that, as Reynolds justly observes, he might borrow without the imputation of poverty.

British Museum.—Among the last accounts printed by order of the House of Commons respecting the British Museum, is a Return of the Number of Persons who have been admitted to view the Museum from Christmas 1826 to Christmas 1832. From this statement it appears that the whole number of visitors for each of the six years to which it refers was—

In 1827	79,131	In 1830	71,336
1828	81,228	1831	99,112
1829	68,101	1832	147,896

What may have been the cause of the very considerable decrease in 1829 and 1830, as compared with the preceding two years, we do not know; but it is at any rate satisfactory to perceive, that in 1831 the number had again risen to something very considerably beyond the highest number of former years. We say it is satisfactory to perceive this; for undoubtedly the diffusion of those tastes, which are to be gratified by a visit to the Museum, may be taken as one evidence of the progress among us of civilization in its highest and truest sense. The increase during the year 1832, however, is much greater than that during the preceding year, in proportion as well as in actual amount. It is within a trifle of fifty per cent., while the whole number is considerably more than double that for 1830. We think we shall not be in error in attributing this extraordinary increase in some degree to the manner in which the attention of the public has been called to the subject during the past year in the 'Penny Magazine.' Indeed we may be quite certain, that a publication circulating to the extent of two hundred thousand copies cannot have failed, by its repeated notices of the objects of interest contained in our great national collection, to send many of its readers, who had not been there before, to examine them with their own eyes; and also to tempt others to pay a second visit, to whom it had, perhaps, given some preparatory information which they did not before possess.

THE SMUT BALLS OR PEPPER BRAND.

[We are indebted for the following interesting paper to Francis Bauer, Esq., a gentleman who has attained a most deserved celebrity for his valuable discoveries connected with the diseases of grain, the most important article of human food.]

THE existence of this destructive disease in wheat has long been known to every agriculturist in England, as well as by those on the Continent; but the real cause of it is yet very little known; not only by the practical cultivator, but even by scientific authors. Such erroneous and contradictory opinions have been advanced that the farmer cannot possibly derive any satisfactory information from them. I hope, however, that the following observations and illustrations of facts may be acceptable to some of the numerous readers of the 'Penny Magazine.'

This disease is occasioned by the seeds of an extremely minute parasitic fungus, of the genus *uredo*, being absorbed by the roots of the germinating wheat grains and propelled by the rising sap, long before the wheat blossoms, into the young germen or ovum, where the seeds of the fungi vegetate, and rapidly multiply, thereby preventing, not only the fecundation of the ovum, but even the development of the parts of fructification. In consequence no embryo is produced in an infected germen, which however continues to grow as long as the sound grains do, and, when the sound grains arrive at maturity, the infected ones are generally larger than, and are easily distinguished from, the sound grains, by their darker green colour, and from the ova retaining the same shape and form which they had at the time when infection took place. See fig. 3 and 4 in the annexed cut; also fig. 1 and 2, which represent sound wheat grains, and are here introduced to show the difference between the infected and the sound grains.

The name of this disease is also as undecided and various as the hitherto supposed causes of its existence; the most prevailing names in England, being *Smut Ball*, Pepper Brand, and Brand Bladders; and many others have been given to it, not only by the farmers in almost every county, but also by scientific naturalists.

No author has yet been found who mentions or describes this species of *uredo*, the distinguishing characteristic of which being its extremely offensive smell; I think the most proper specific name for it would be that of *uredo fœtida*.

The earliest period at which I discovered the parasite within the cavity of the ovula of a young plant of wheat (the seed grain of which had been inoculated with the fungi of *uredo fœtida*, and sown the 14th of November

1805) was the 5th of June, 1806, being sixteen days before the ear emerged from its hose, and about twenty days before the sound ears, springing from the same root, were in bloom. At that early stage the inner cavity of the ovum is very small; and, after fecundation, is filled with the albumen or farinaceous substance of the seed, and already occupied by many young fungi, which, from their jelly-like root or spawn, adhere to the membrane which lines the cavity, and from which they can be easily detached in small flakes with that spawn: in that state their very short pedicles may be distinctly seen. See fig. 7. At first the fungi are of a pure white colour, and when the ear emerges from its hose the ovum is much enlarged, but still retains its original shape, and, the fungi rapidly multiplying, many have then nearly come to maturity, assumed a darker colour, and having separated from the spawn, lie loose in the cavity of the ovum: the infected grains continue growing, and the fungi continue to multiply till the sound grains have attained their full size and maturity, when the infected grains are easily distinguished from the sound ones by being generally larger, and of a darker green colour; and if opened, they appear to be filled to excess with these dark-coloured fungi; but the grains infected with the uredo fœtida very rarely burst, and these fungi are seldom found on the outside of the grain; but if the grain be bruised they readily emit their offensive smell, which is worse than that from putrid fish. When the sound grains are perfectly ripe and dry, and assume their light brown colour, the infected grains also change, but to a somewhat darker brown, retaining however the same shape which the ovum had at its formation; the rudiments of the stigma also remaining unaltered. See fig. 3 and 4, and compare them with the sound grain, fig. 1 and 3.

If the infected grain be cut in two, it will be found to consist solely of the outermost integument of the ovum, filled with the ripe black fungi, without any trace of the embryo or albumen. See fig. 5.

Plants of wheat infected with the *Pepper Brand* may be easily distinguished in the field by their size, being generally several inches higher than plants not infected, and larger in bulk; and I have found in all instances a greater number of stems produced from the same root, the ears containing more spickets, and those spickets more perfect grains, than were contained in those of sound plants, of the same seed, and growing in the same field.

One plant, produced from seed which I had inoculated, had twenty-four complete stems and ears, some of the stems with the ears measuring above five feet, every part of the plant proportionally large, and all the ears entirely infected. Another specimen had eight stems from the same root, five of them were above six feet high, and the ears entirely infected; the other three stems were considerably shorter, their ears smaller, and their grains perfectly sound.

This enlargement of the plant, however, is not to be attributed to the infection, but is undoubtedly the consequence of a luxurious vegetation, produced by a rich or moist soil, which secures and promotes the infection more than a dry or moderately rich soil.

Neither does this disease always affect the entire ear; I found some ears having one side infected, whilst the opposite side was perfectly sound. Sometimes five or six perfectly sound grains are found in an infected ear, and a few thoroughly infected grains are found in an otherwise sound ear. The infected grains are always in the last spicket at the apex of the ear; from which it appears that the infecting seed of the fungi did not reach the ovum before fecundation: in some of these grains a portion of the albumen was formed, but no trace of an embryo existed; but in others there was a considerable portion of albumen, and a perfect embryo formed. See fig. 6.

At the time when the sound grains change their colour, the fungi, being ripe, cease to multiply; they are all of a globular form, and nearly of equal size, viz. $\frac{1}{1600}$ part of an inch in diameter. Fig. 8 is $\frac{1}{160000}$ part of a square inch on the micrometer; it sustains sixteen full grown fungi of uredo fœtida; and this square, being represented of the size of a square inch, English measure, is consequently magnified one hundred and sixty thousand times in superficies, and the sixteen fungi represented in that square are magnified in the same degree; showing that no less than two millions five hundred and sixty thousand individual fungi would be required to cover one square inch.

Fig. 9 represents a fungus not quite ripe, with its short pedicle; and fig. 10 a perfectly ripe one, both magnified one thousand times lineally, or one million times superficially. These figures are thus highly magnified, to show the reticular structure of these fungi, which forms the external membrane; and it appears that the internal substance consists of a cellular tissue.

Fig. 11 represents one of the fungi shedding its seeds, which is only observable when viewed under water. I could never yet see the seeds of these fungi in a dry state, for they then appear to be mixed with some mucous fluid, which causes them to adhere together in hard lumps.

That the seeds of the fungi of uredo fœtida are the sole cause of that destructive disease in wheat, the *Pepper Brand*, I think I have fully ascertained by numerous experiments of inoculating even the finest and purest samples of seed-wheat; and if that fact be admitted, it becomes evident that the prevention of it can only be effected by cleansing the seed-wheat so effectually, that every particle of the fungi and their seed be entirely removed from the grains. But as these extremely minute fungi, when once mixed with the seed-wheat, insinuate themselves into the grooves at the backs and the beards at the tops of the wheat-grains, I think it almost impossible to dislodge them by the mere process of washing. I once received some samples which had been so prepared, and washed in salt water, and declared to be perfectly clean; but on my putting some of these purified grains into water, in a watch-glass, and leaving them to soak about twelve hours, on then bringing them under the microscope I found many of the fungi floating on the water. This fact convinces me that mere cleansing is no secure preventive of this disease; and that the most efficacious, and perhaps the only remedy for preventing it, is that of depriving the seeds of the fungi of their vitality. To effect this, innumerable remedies have been recommended, and I believe applied by the farmers, but have seldom proved entirely successful. From my own often repeated experiments, though on a limited scale, I am convinced that the best and surest remedy is to steep the seed-wheat in properly prepared lime-water, leaving it to soak at least twelve hours, and then to dry it well in the air before sowing it; but I fear that it will be found very difficult, if not impossible, even by this method, to kill the seeds of the fungi entirely, when the quantity of seed-corn is great; and consequently some infected plants might still be found in large fields.

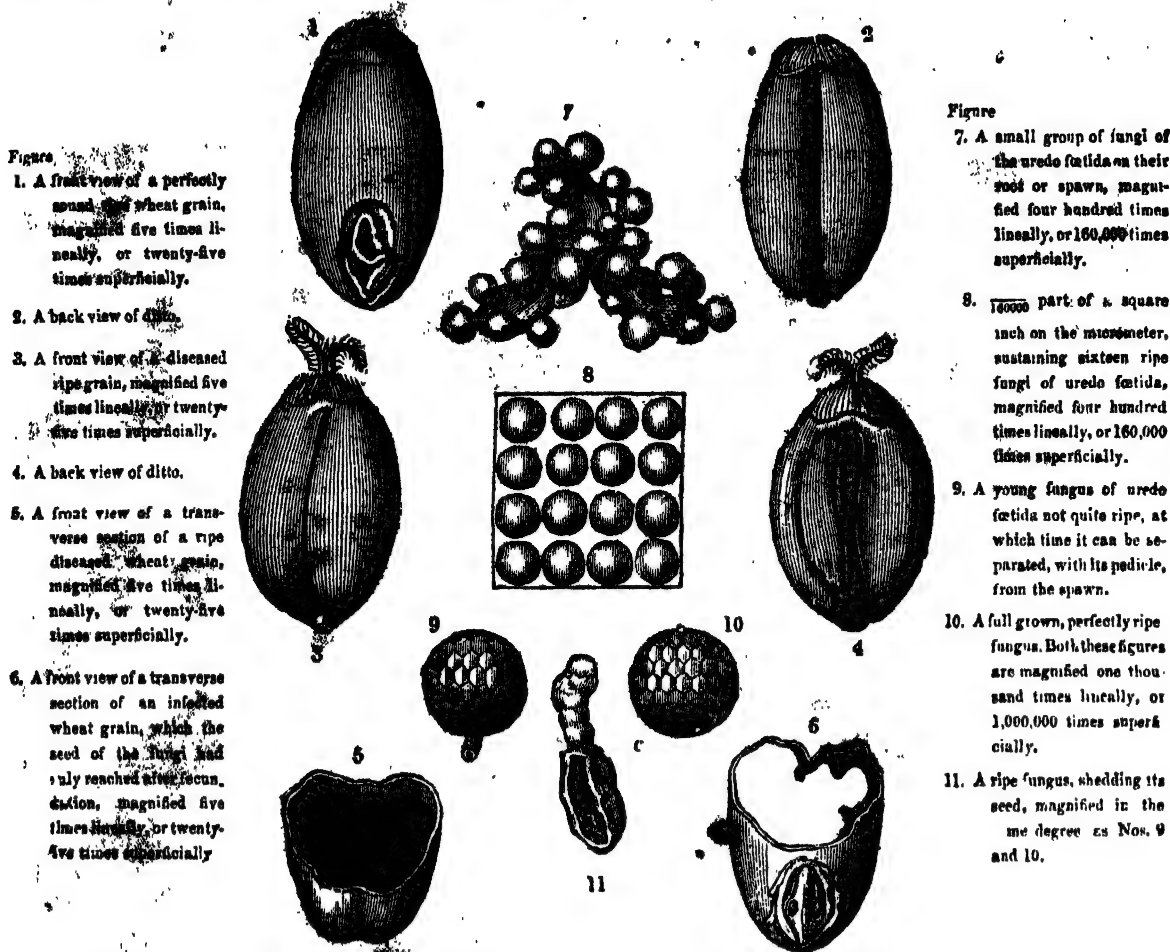
Steeping and properly drying the seed-corn in the above manner, not only prevents the disease arising from the infected seed-corn, but does also effectually prevent the clean seed from being infected by the seed of the fungi, which might exist in the soil of a field on which diseased wheat had been growing before; and consequently the cleanest samples of seed-wheat should be steeped, as well as the most notoriously infected.

These facts I have ascertained by repeated experiments of strongly inoculating with the fungi seed-corn which before had been properly steeped and dried, and

the result has always proved satisfactory, for the infection never took place.

Wheat is the only plant that is liable to be affected by the Pepper Brand, which is occasioned by the uredo fœtida. The Smut, or Dust Brand, is also occasioned by an uredo, but of a decidedly different species.

Kew, February 21, 1833. F. B.



Figure

1. A front view of a perfectly sound wheat grain, magnified five times lineally, or twenty-five times superficially.
2. A back view of ditto.
3. A front view of a diseased ripe grain, magnified five times lineally, or twenty-five times superficially.
4. A back view of ditto.
5. A front view of a transverse section of a ripe diseased wheat grain, magnified five times lineally, or twenty-five times superficially.
6. A front view of a transverse section of an infected wheat grain, which the seed of the fungi had only reached after fecundation, magnified five times lineally, or twenty-five times superficially.

Figure

7. A small group of fungi of the uredo fœtida on their root or spawn, magnified four hundred times lineally, or 160,000 times superficially.
8. $\frac{1}{160000}$ part of a square inch on the micrometer, sustaining sixteen ripe fungi of uredo fœtida, magnified four hundred times lineally, or 160,000 times superficially.
9. A young fungus of uredo fœtida not quite ripe, at which time it can be separated, with its pedicle, from the spawn.
10. A full grown, perfectly ripe fungus. Both these figures are magnified one thousand times lineally, or 1,000,000 times superficially.
11. A ripe fungus, shedding its seed, magnified in the same degree as Nos. 9 and 10.

Written Newspapers.—The desire of news from the capital, on the part of the wealthier country residents, and probably the false information and the impertinence of the news-writers, led to the common establishment of a very curious trade,—that of a news correspondent, who, for a subscription of three or four pounds per annum, wrote a letter of news every post-day to his subscriber in the country. This profession probably existed in the reign of James I.; for in Ben Jonson's play 'The Staple of News,' written in the first year of Charles I., we have a very curious and amusing description of an office of news manufactures:

> "This is the outer room where my clerks sit,
> And keep their sides, the Register i' the midst;
> The Examiner, he sits private there, within;
> And here I have my several rolls and files
> Of news by the alphabet, and all put up
> Under their heads."

The news thus communicated appears to have fallen into as much disrepute as the public news. In the advertisement announcing the first number of the 'Evening Post,' (September 6th, 1709,) it is said, "There must be three or four pound per annum paid by those gentlemen who are out of town, for written news, which is so far, generally, from having any probability of matter of fact in it, that it is frequently stuffed up with a *We hear, &c.*; or, *an eminent Jew merchant has received a letter, &c.*; being nothing more than downright fiction." The same advertisement, speaking of the published papers, says, "We read more of our own affairs in the Dutch papers than in any of our own." The trade of a news correspondent seems to have suggested a sort of union of written news and published news; for towards the end of the seventeenth century, we have *news-letters* printed in type to imitate writing. The most famous of these was that commenced by Ichabod Dawks, in 1696, the first number of which was thus announced: "This letter will be done upon good writing paper, and blank space left, that any gentleman may write his own private business. It does undoubtedly exceed the best of the *written news*, contains double the quantity, is read with abundance more ease and pleasure, and will be useful to improve the younger sort in writing a curious hand."—*Companion to the Newspaper.*

⁎ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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THE BEAVER.



[Beavers, with their Huts and a Dam.]

The extraordinary instincts of the beaver, in a state of freedom, have long furnished one of the most attractive subjects of Natural History. Much that is false and exaggerated has found its way into the common descriptions of the habits of these animals; and the really extraordinary qualities which the species display, have been referred to an intelligence approaching that of the human race. The singular actions of the beaver are suggested by instinct alone—the same instinct which guides the ant and the bee. Each individual beaver is precisely the same in its faculties as another; they are all untaught—they are all incapable of teaching—they all remain the same in point of intelligence from generation to generation.

The exaggeration which absurdly prevails with regard to the habits of the beaver may be referred to unavoidable causes. The species are exceedingly timid and vigilant, and invariably labour in the night-time. Thus, few persons competent to observe them accurately have had the opportunity of doing so. The greater part of our information is derived from the fur-traders and Indians; and these men are ignorant and credulous, deceiving themselves and deceiving others. The best account we have seen of the habits of the beaver is that by Dr. John Godman, Professor of Natural History in the Franklin Institute of Pennsylvania. It is given in the second volume of his 'American Natural History;' and this we shall abridge.

The general aspect of the beaver, at first view, would remind one of a very large rat, and seen at a little distance it might be readily mistaken for the common musk-rat. But the greater size of the beaver, the thickness and breadth of its head, and its horizontally flattened, broad and scaly tail, render it impossible to mistake it, when closely examined, for any other creature.

In a state of captivity or insulation, the beaver is a quiet or rather stupid animal, evincing about as much intelligence as a tamed badger, or any other quadruped which can learn to distinguish its feeder, come when called, or grow familiar with the inmates of the house where it is kept. It is only in a state of nature that the beaver displays any of those singular modes of acting which have so long rendered the species celebrated. Their extraordinary instincts are applied to two principal objects: 1. To secure a sufficient depth of water to prevent it from being frozen to the bottom; 2. To construct huts, in which they pass the winter.

If beavers choose a spot for their residence where the water is not of sufficient depth, they set about obviating the inconvenience by building a dam. The

materials used for the construction of their dams are the trunks and branches of small birch, mulberry, willow, poplar, &c. They begin to cut down their timber for building early in the summer, but their edifices are not commenced until about the middle or latter part of August, and are not completed until the beginning of the cold season. The strength of their teeth and their perseverance in this work, may be fairly estimated by the size of the trees they cut down. Dr. Best informs us that he has seen a mulberry-tree, eight inches in diameter, which had been gnawed down by the beaver. Dr. Godman saw, while on the banks of the Little Miami river, several stumps of trees, which had evidently been felled by these animals, of at least five or six inches in diameter. These are cut in such a manner as to fall into the water, and then floated towards the site of the dam or dwellings. Small shrubs, &c. cut at a distance from the water, are dragged with their teeth to the stream, and then launched and towed to the place of deposit. At a short distance above a beaver-dam the number of trees which have been cut down appears truly surprising, and the regularity of the stumps which are left might lead persons unacquainted with the habits of the animal to believe that the clearing was the result of human industry.

The figure of the dam varies according to circumstances. Should the current be very gentle, the dam is carried nearly straight across; but when the stream is swiftly flowing, it is uniformly made with a considerable curve, having the convex part opposed to the current. Along with the trunks and branches of trees they intermingle mud and stones, to give greater security; and when dams have been long undisturbed and frequently repaired, they acquire great solidity, and their power of resisting the pressure of water and ice is greatly increased by the willow, birch, and other cuttings occasionally taking root, and eventually growing up into something of a regular hedge. The materials used in constructing the dams are secured solely by the resting of the branches, &c. against the bottom, and the subsequent accumulation of mud and stones, by the deposit of the stream or by the industry of the beavers.

The dwellings of the beaver are formed of the same materials as their dams, and are very rude, though strong, and adapted in size to the number of their inhabitants. These are seldom more than four old and six or eight young ones.

When building their houses, they place most of the wood crosswise and nearly horizontally, observing no other order than that of leaving a cavity in the middle. Branches which project inward are cut off with their teeth and thrown among the rest. The houses are by no means built of sticks first and then plastered, but all the materials, sticks, mud, and stones, if the latter can be procured, are mixed up together, and this composition is employed from the foundation to the summit. The mud is obtained from the adjacent banks or bottom of the stream or pond near the door of the hut. The beaver always carries mud and stones by holding them between his fore-paws and throat.

Their work is all performed at night, and with much expedition. When straw or grass is mingled with the mud used by them in building, it is an accidental circumstance, owing to the nature of the spot whence the mud was taken. As soon as any part of the material is placed where it is intended to remain, they turn round and give it a smart blow with the tail. The same sort of blow is struck by them upon the surface of the water when they are in the act of diving.

The outside of the hut is covered or plastered with mud late in the autumn, and after frost has begun to appear. By freezing it soon becomes almost as hard as stone, effectually excluding their great enemy, the wolverene, during the winter. Their habit of walking over the work frequently during its progress, has led to the absurd idea of their using the tail as a trowel. The habit of flapping with the tail is retained by them in a state of captivity, and, unless it be in the acts already mentioned, appears designed to effect no particular purpose. The houses, when they have stood for some time, and been kept in repair, become so firm from the consolidation of all the materials, as to require great exertion and the use of the ice-chisel, or other iron instruments, to be broken open. The laborious nature of such an undertaking may easily be conceived, when it is known that the tops of the houses are generally from four to six feet thick at the apex of the cone. Hearne relates having seen one instance in which the crown or roof of the hut was more than eight feet in thickness.

The door or hole leading into the beaver-hut is always on the side farthest from the land, and is near the foundation of the house, or at a considerable depth under water. This is the only opening into the hut, which is not divided into chambers.

All the beavers of a community do not co-operate in the fabrication of houses for the common use of the whole. Those who are to live together in the same hut, labour together in its construction, and the only affair in which all seem to have a joint interest, and upon which they labour in concert, is the dam, as this is designed to keep a sufficient depth of water around all the habitations.

In situations where the beaver is frequently disturbed and pursued, all its singular habits are relinquished, and its mode of living changed to suit the nature of circumstances, and this occurs even in different parts of the same rivers. Instead of building dams and houses, its only residence is then in the banks of the stream, where it is now forced to make a more extensive excavation, and be content to adopt the manners of a musk rat. More sagacity is displayed by the beaver in thus accommodating itself to circumstances, than in any other action it performs. Such is the caution which it exercises to guard against detection, that were it not for the removal of small trees, the stumps of which indicate the sort of animal by which they have been cut down, the presence of the beaver would not be suspected in the vicinity. All excursions for the sake of procuring food are made late at night, and if it pass from one hole to another during the day time, it swims so far under water as not to excite the least suspicion of the presence of such a voyager. On many parts of the Mississippi and Missouri, where the beaver formerly built houses according to the mode above described, no such works are at present to be found, although beavers are still to be trapped in those localities.

These animals also have excavations in the adjacent banks, at rather regular distances from each other, which have been called *washes.* These excavations are so enlarged within, that the beaver can raise his head above water in order to breathe without being seen, and when disturbed at their huts, they immediately make way under water to these washes.

The beaver feeds principally upon the bark of the aspen, willow, birch, poplar, and occasionally the alder, but it rarely resorts to the pine tribe, unless from severe necessity. They provide a stock of wood from the trees mentioned, during the summer season, and place it in the water opposite the entrance to their houses. They also depend in a great degree upon the large roots (of the *nuphar luteum*) which grow at the bottom of the lakes, ponds, and rivers, and may be procured at all seasons.

The number of young produced by the beaver at a litter is from two to five. The young beavers whine in such a manner as closely to imitate the cry of a child. Like the young of most other animals they are very playful, and their movements are peculiarly interesting as

may be seen by the following anecdote, related in the narrative of Capt. Franklin's perilous journey to the shores of the Arctic Sea:—"One day a gentleman, long resident in the Hudson's Bay country, espied five young beavers sporting in the water, leaping upon the trunk of a tree, pushing one another off, and playing a thousand interesting tricks. He approached softly, under cover of the bushes, and prepared to fire on the unsuspecting creatures, but a nearer approach discovered to him such a similitude betwixt their gestures and the infantile caresses of his own children, that he threw aside his gun and left them unmolested."

The beaver swims to considerable distances under water, but cannot remain for a long time without coming to the surface for air. They are therefore caught with greater ease, as they must either take refuge in their vaults or washes in the bank, or seek their huts again for the sake of getting breath. They usually, when disturbed, fly from the huts to these vaults, which, although not so exposed to observation as their houses, are yet discovered with sufficient ease, and allow the occupant to be more readily captured than if he had remained in the ordinary habitation.

To capture beavers residing on a small river or creek, the Indians find it necessary to stake the stream across to prevent the animals from escaping, and then they try to ascertain where the vaults or washes in the banks are situated. This can only be done by those who are very experienced in such explorations. The hunt takes place in winter, because the animal's fur is then in the best order. The hunter is furnished with an ice-chisel lashed to a handle four or five feet in length; with this instrument he strikes against the ice as he goes along the edge of the banks. The sound produced by the blow informs him when he is opposite to one of these vaults. When one is discovered, a hole is cut through the ice of sufficient size to admit a full-grown beaver, and the search is continued until as many of the places of retreat are discovered as possible. During the time the most expert hunters are thus occupied, the others with the women are busy in breaking into the beaver-houses, which, as may be supposed from what has been already stated, is a task of some difficulty. The beavers, alarmed at the invasion of their dwelling, take to the water and swim with surprising swiftness to their retreats in the banks, but their entrance is betrayed to the hunters watching the holes in the ice, by the motion and discolouration of the water. The entrance is instantly closed with stakes of wood, and the beaver, instead of finding shelter in his cave, is made prisoner and destroyed. The hunter then pulls the animal out, if within reach, by the introduction of his hand and arm, or by a hook designed for this use, fastened to a long handle. Beaver-houses found in lakes or other standing waters offer an easier prey to the hunters, as there is no occasion for staking the water across.

The number of beavers killed in the northern parts of America is exceedingly great, even at the present time, after the fur trade has been carried on for so many years, and the most indiscriminate warfare waged uninterruptedly against the species. In the year 1820, sixty thousand beaver skins were sold by the Hudson's Bay Company alone.

It is a subject of regret that an animal so valuable and prolific should be hunted in a manner tending so evidently to the extermination of the species, when a little care and management on the part of those interested might prevent unnecessary destruction, and increase the sources of their revenue.

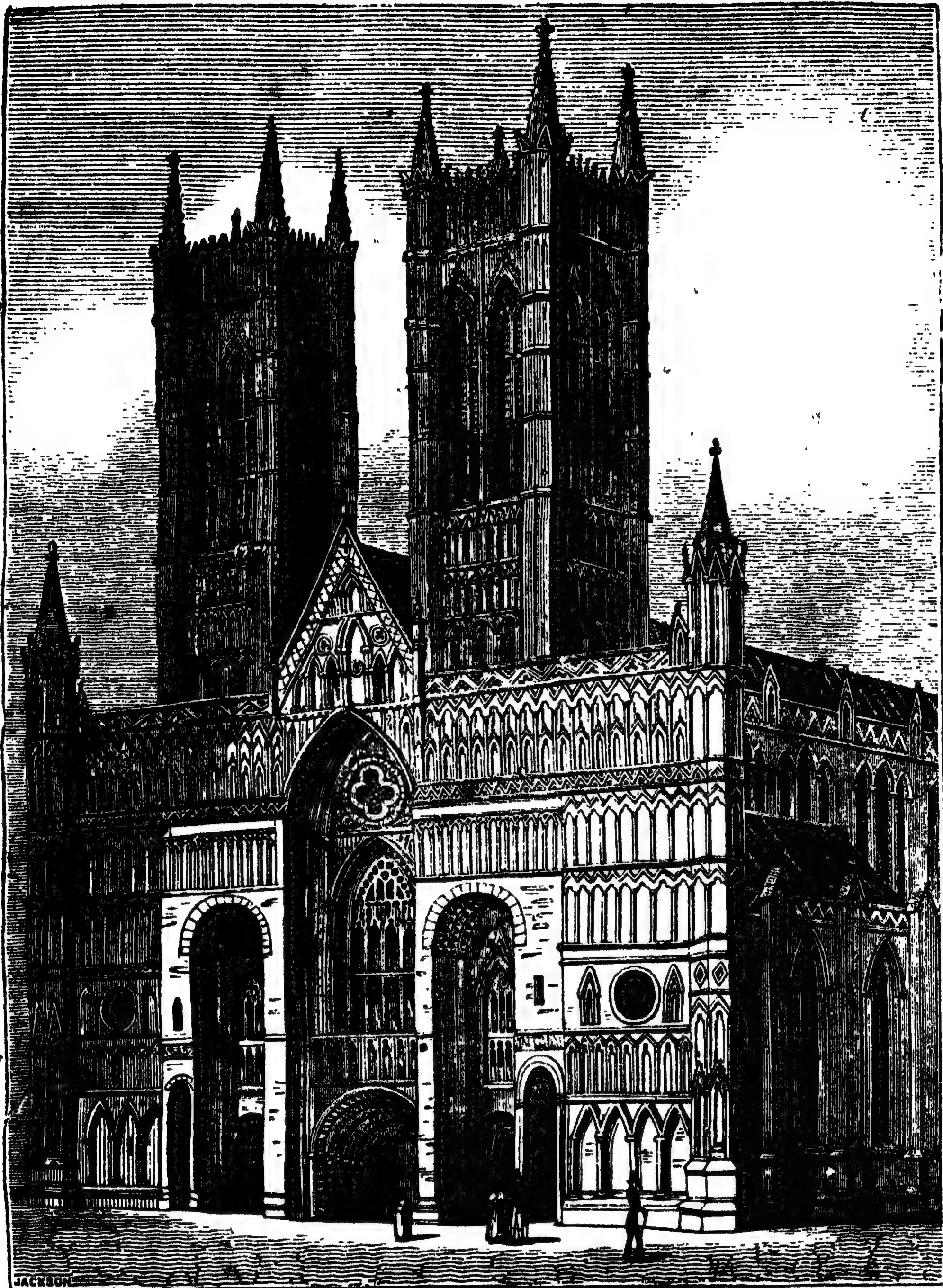
In a few years, comparatively speaking, the beaver has been exterminated in all the Atlantic and in the western states, as far as the middle and upper waters of the Missouri; while in the Hudson's Bay possessions they are becoming annually more scarce, and the race will eventually be extinguished throughout the whole continent.

The Indians inhabiting the countries watered by the tributaries of the Missouri and Mississippi, take the beavers principally by trapping, and are generally supplied with steel traps by the traders, who do not sell, but lend or hire them, in order to keep the Indians dependent upon themselves, and also to lay claim to the furs which they may procure. The business of trapping requires great experience and caution, as the senses of the beaver are very keen, and enable him to detect the recent presence of the hunter by the slightest traces. It is necessary that the hands should be washed clean before the trap is handled and baited, and that every precaution should be employed to elude the vigilance of the animal. The bait which is used to entice the beavers is prepared from the substance called castor (*castoreum*) obtained from the glandulous pouches of the male animal, which contain sometimes from two to three ounces.

During the winter season the beaver becomes very fat, and its flesh is esteemed by the hunters to be excellent food. But those occasionally caught in the summer are thin, and unfit for the table. They lead so wandering a life at this season, and are so much exhausted by the collection of materials for building, or the winter's stock of provision, as well as by suckling their young, as to be generally at that time in a very poor condition. Their fur during the summer is of little value, and it is only in winter that it is to be obtained in that state which renders it so desirable to the fur-traders.

Snake-Charmers.—Our account of the power supposed to be possessed by persons in the art of charming snakes, gave the best evidence we could collect upon the subject. The following communication would imply that the suspicions of trick in this curious process are unfounded. The writer says he received the narrative from a gentleman of high station in the Honourable Company's Civil Service at Madras—a man of undoubted veracity. "One morning as I sat at breakfast, I heard a loud noise and shouting amongst my palenkeen-bearers. On inquiry, I learned that they had seen a large hooded snake (*Cobra capella*), and were trying to kill it. I immediately went out, and saw the snake climbing up a very high green mound, whence it escaped into a hole in an old wall of an ancient fortification: the men were armed with their sticks, which they always carry in their hands, and had attempted in vain to kill the reptile, which had eluded their pursuit, and in his hole he had coiled himself up secure; whilst we could see his bright eyes shining. I had often desired to ascertain the truth of the report, as to the effect of music upon snakes: I therefore inquired for a snake-catcher. I was told there was no person of the kind in the village; but after a little inquiry I heard there was one in a village distant three miles. I accordingly sent for him, keeping a strict watch over the snake, which never attempted to escape whilst we, his enemies, were in sight. About an hour elapsed when my messenger returned, bringing a snake-catcher. This man wore no covering on his head, nor any on his person, excepting a small piece of cloth round his loins: he had in his hands two baskets, one containing tame snakes—one empty: these and his musical pipe were the only things he had with him. I made the snake-catcher lean his two baskets on the ground at some distance, while he ascended the mound with his pipe alone. He began to play: at the sound of music the snake came gradually and slowly out of his hole. When he was entirely within reach, the snake-catcher seized him dexterously by the tail, and held him thus at arm's length; whilst the snake, enraged, darted his head in all directions —but in vain: thus suspended, he has not the power to round himself so as to seize hold of his tormentor. He exhausted himself in vain exertions; when the snake-catcher descended the bank, dropped him into the empty basket, and closed the lid: he then began to play, and after a short time, raising the lid of the basket, the snake darted about wildly, and attempted to escape; the lid was shut down again quickly, the music always playing. This was repeated two or three times; and in a very short interval, the lid being raised, the snake sat on his tail, opened his hood, and danced quite as quietly as the tame snakes in the other basket; nor did he again attempt an escape. This, having witnessed with my own eyes, I can assert as a fact."

LINCOLN CATHEDRAL.



[West Front of Lincoln Cathedral.]

This, regarded in its architectural character, is one of the noblest of our own cathedrals; and it is also venerable for its antiquity, and on account of the pious munificence of which it is a monument. The original seat of the bishopric of Lichfield was at the village of Dorchester in Oxfordshire. A church was built here so early as the year 635. Soon after this, namely, about the year 678, another see was established at Sydnacester, on the Trent, which was united with that of Dorchester in the ninth century, on the district in which it was situated being overrun by the Danes. The last bishop who resided during the whole time of his incumbency at Dorchester was Ulf, or Wulfin, who died in 1067. His successor, Remigius de Fescamp, called St. Remigius, removed the episcopal seat to Lincoln some time between 1072 and 1092. He also built the first cathedral there, which he just lived to finish, dying on the 9th of May, 1092, only a few days before its consecration; and the present structure is still the original cathedral of St. Remigius, although in part rebuilt and greatly enlarged. The lower portion of the west front, as it yet remains, is the work of that bishop. The next oldest parts of the building are those that were erected towards the end of the twelfth century, by Bishop Hugh de Grenoble, a prelate of extraordinary piety, and also popularly distinguished by the title of Saint. An earthquake which happened in 1185 had thrown down a great part of the work of St. Remigius, when St. Hugh undertook to restore the cathedral to more than its original splendour. The good bishop was so intent, we are told by Matthew Paris, upon the completion of his pious enterprise that he was wont to carry stones and mortar on his own shoulders for the use of the masons. The east side of the central transept is considered to be a still remaining portion of the additions made by St. Hugh. In 1239 the greater part of the central tower fell down; but it was rebuilt by the famous Robert Grostête, or Greathead, one of the most learned per

sonages of that era, who was then bishop of the diocese. Bishop Grostete is one of those cultivators of physical science in the dark ages to whom is ascribed the fabrication of a brazen head, which is said to have been able to speak as if it had had life. A similar fable is related of Albertus Magnus and our other illustrious countryman Roger Bacon. To the tower rebuilt by Grostete, Bishop D'Alderly, who governed the see from 1300 to 1319, added a lofty spire of wood, which remained till it was blown down by a tempest in 1547. The same prelate is supposed to have built the two western towers, which he also surmounted with wooden spires. They were taken down by the Dean and Chapter in 1808. The person by whom the remaining parts of the fabric were principally erected, was John Welbourne, who was treasurer of the cathedral from 1351 to 1381. The upper part of the south end of the great transept, the stalls of the choir, and the statues and windows above the western entrances, are ascribed to him. Since his time no considerable additions have been made to the building; but it has frequently undergone extensive repairs. Like many of our other cathedrals, the Minster, as it is commonly called, of Lincoln was subjected, during the civil wars, and the existence of the commonwealth, to the most wanton desecration and injury.

The Cathedral of Lincoln stands upon ground of considerable elevation, and, overlooking a flat country, may be seen from the distance of twenty miles. Fuller remarks that its floor is higher than the roofs of most other churches. It is built in the usual form of a cross, with this peculiarity however, that besides the great transept in the centre, it has also shorter transepts both at the east and the west end. A building, called the cloisters, issues from the north wall, and to the extremity of this is attached the chapter-house, a circular structure, surrounded by deep buttresses, and surmounted by a pyramidal roof. The dimensions of the cathedral are very great, the whole length of the interior being 470 feet. The western front is 174 feet wide, and the length of the great transept is 220 feet in the interior. Its width is 63 feet, and its height 74. The chapter-house is above 60 feet in diameter, the roof being supported by a single cluster of columns in the centre. The circumference of this room is divided into ten compartments, or sides, one of which is occupied by the door, and the other nine by windows.

The most imposing exterior part of the cathedral is the west front. It has been preferred by some eminent judges to any thing in York Minster. The centre of the under portion of it is occupied by a large and deep door-way, leading into the nave, on both sides of which are humbler entrances into the aisles. Above these is a façade, richly ornamented with windows, niches, and statues. Groups of turrets crown the extremities, and two towers, rising to the height ot 206 feet, surmount the whole. The great central tower is 262 feet in height; and pinnacles shoot from each corner both of it and of the western towers. Similar ornaments rise above each buttress along the whole extent of the nave and choir.

The Cathedral of Lincoln was in old times celebrated for the extraordinary splendour of its shrines, and other decorations; but the reformation stripped it of all this wealth. Down to a much later period, however, it was crowded with ancient tombs, many of them curious for their rich sculpture, others highly interesting on account of those whose remains they contained, and of whom they were memorials. They were, however, nearly all destroyed in the time of the commonwealth. When the storm of the civil wars was felt to be approaching, Sir William Dugdale, in 1641, proceeded to copy all the epitaphs he could find in Lincoln and other cathedrals, "to the end," as he says in his Life, "that the memory of them, in case of that destruction then imminent, might be preserved for future and better times;" and in the second volume of Peck's Desiderata Curiosa is given an account of one hundred and sixty-three monumental inscriptions, as they stood in this cathedral in the year mentioned ("most of which," it is affirmed, "were soon after torn up, or otherwise defaced"), collected by Robert Sanderson, who afterwards became bishop of this see, and corrected by Dugdale's Survey.

DESCRIPTION OF SICILY.

The beautiful and fertile island of Sicily, in the Mediterranean, occupies a surface of about 10,642 British square miles, and has a population of 1,787,771 inhabitants; being in the proportion of 168 to each square mile. Its population is said to have been much greater in ancient times, but it is now considerably more than it was fifty years ago, having been 1,123,163 in the year 1770; and 1,619,305 in the year 1798.

Sicily was formerly the granary of ancient Rome, and it has still capabilities of feeding a population very far exceeding its own, if its agriculture were not depressed and shackled by bad husbandry and erroneous regulations. Artificial meadows are unknown; so are potatoes, turnips, beets, and other green crops; unless when planted with beans or peas, the ground is constantly cropped with corn, with intervals of one or two years' fallow or wild pasture. The soil, though badly cleaned and manured, yields upon an average eight for one, in some districts sixteen for one, and in some few, even thirty-two for one. The land is let in large tracts to companies of farmers, or rather shepherds, some of them proprietors of ten or twelve thousand sheep. The different flocks feed together, and once a year an account is taken of them, the result of which is afterwards entered in a book, where each of the proprietors is debited and credited with his share of the proceeds and expenses, in proportion to his number of sheep, and credited with the proceeds of the milk converted into cheese, of the butter-milk, of the wool, and of the rent of a portion of the land let to under-tenants.

There are in Sicily many well cultivated vineyards; and the wine of Milazzo, of Syracuse, of Avola, and Vittoria go to Italy. That of Marsala is exported to all parts of the world, and is largely consumed in England. Hemp is also grown; but corn is the main produce of the island, and it is received in certain public magazines free of charge, which in some parts of the island are rather excavations into calcareous rocks, or holes in the ground, shaped like a bottle, walled up and made waterproof, containing each about 1600 English bushels of corn. The receipt of the *caricatore*, or keeper of the magazine, being a transferable stock, is the object of some gambling on the public exchanges of Palermo, Messina, and Catania, the speculations being grounded on the expected rise or fall of corn. So long has corn been preserved by these means, that it has been found perfectly good after the lapse of a century. The olive grows to a larger size in Sicily than on the continent of Italy, and attains a greater age, there being evidence of trees having reached the age of seven or eight centuries. The peasants respect the olive, and cannot bear that they should be destroyed, yet they take no care of them, and the oil they make is, in general, only fit for soap-boilers. The pistachio nut is cultivated here, as well as a large sort of beans, which answer the purpose of potatoes, and forming a considerable part of the food of both men and animals. The Sicilian honey is in much estimation, and owing to the great consumption of wax in churches, the proceeds of bee-hives form a valuable item in husbandry. Some cotton is grown about Terranova and Catania; and these are the principal natural resources of the country.

The chief town in Sicily is Palermo, containing

about 200,000 inhabitants. It is paved with large flat pieces of lava, with the addition of side-walks, upon which the tradespeople, such as shoemakers, tailors, &c. carry on their respective trades out of doors. There is a beautiful public garden in the town, with a fine view of the sea on one side, and on the other of the mountains which enclose the nook of level land, called the *Conca d'Oro*, or Golden Shell, in which Palermo is situated; and the fore-ground of which is occupied by fragrant groves of acacias and of orange-trees. It is overspread with villages and farms, and country houses, where people of fortune reside during the month of May, and again during part of September and October, when the rainy season is over. There is a school, the *scuola normale*, at Palermo, composed of no fewer than nine hundred and forty boys, from the age of six to that of fourteen. The mode of life of the higher ranks differs little from that of the Neapolitans. They rise very late, take a walk, dine between three and four, drive or walk about the sea-side every evening; then to the opera; then to the card-table at night; then to bed at day-break. They take no pleasure in agriculture, and never visit their landed estates in the provinces. The country houses, where they spend a few weeks in spring and autumn, being all in the neighbourhood, they live there exactly as in town. Their *conversazioni* are just the same as in Italy; people meet to play cards and eat ice, but converse very little. A man-servant at Palermo receives three *carlini* a day (thirteen pence sterling), with his board and livery; a labourer from three to four *carlini* a day, and finds his own food: but provisions are very cheap. Female servants are procured with difficulty. Land in this neighbourhood is let at about four per cent. on its estimated value. The farmers are said to be very ignorant, and to keep their accounts by means of marks or tallies. The paternal lands of noble families are entailed, and cannot be sold without special leave of the king, but purchased land may.

Messina has suffered severely from earthquakes, and was completely demolished in 1783, since which it has had the advantage of new and regular buildings. Its population is now about 70,000. Its fine quay extends more than a mile along the port, and a rocky and sandy head-land, projecting circularly, forms a deep, spacious, and tranquil harbour, accessible nearly at all times, notwithstanding the proximity of Scylla and Charybdis. Education is said to be much neglected at Messina; and the nobility do not in general reside there. It is, in short, neither fashionable, nor learned, nor rich.

Among the other towns are Syracuse, abounding with antiquities, the remains of the ancient city of that name, and Catania, in the immediate neighbourhood of Mount Etna, which has very frequently overwhelmed it by eruptions. At every such convulsion Catania has been more or less injured; but it has thrice been completely overturned or burnt down, and its inhabitants wholly or in part swallowed up, viz. once in the twelfth century, and twice in the seventeenth. Of Mount Etna, we must give an account on another occasion. Those who wish for a more circumstantial description of Sicily, should consult Brydone and Lukie's Tours, and especially Simond's Travels in Italy and Sicily, from which this account is chiefly compiled.

THE LIVING STATUE.

It often happens that motion is permanently lost in one or more joints, a disease to which surgeons have given the name of *Anchylosis*, but in the following remarkable case, which we take from the Dictionnaire des Sciences Médicales, every joint in the body became anchylosed, so that, as M. Percy observes, the brazen skeleton offered by Hippocrates in the Temple of Delphos could not be more inflexible.

The patient, whose name was Simorre, was born at Mirepoix, in the department of Arriège, on the 28th of October, 1752; he entered the army at the age of fifteen, and served for twenty-one years in the regiment of Berry, where he reached the rank of captain. He was in the three Corsican campaigns, and during the war contracted the seeds of his disease by bivouacking on a cold and marshy soil. He first suffered from shooting pains in the great toes and ankles, alternating with inflammation of the eyes; and in 1785 he could no longer walk without assistance. In the following year all his joints were affected at once, and the *anchylosis* made most alarming progress. He was obliged to quit the service, and retired to Metz. He long struggled with fortitude against his disease; his limbs were growing stiff, and in spite of his sufferings he forcibly endeavoured to move them. His arms and his head underwent the lot of his feet and knees; the whole body became inflexible; even the lower jaw, which in other persons has remained moveable, became fixed like the other joints. Simorre, to use his own expression, was then no more than a living corpse. He might, indeed, says M. Percy, have been considered comparatively happy in this unfortunate situation, had he had the insensibility of a real corpse. But far from enjoying this melancholy repose he suffered the most excruciating pain. He passed four months in an easy-chair, as it was not possible to get him into bed. His posture in the chair is that of his skeleton, which is still preserved at Paris, for it was at this period that his joints became entirely useless. He was then placed in his bed, where he passed two years without sleeping, for as soon as he closed his eyes his limbs were agitated by the most violent startings. Opium did not relieve him. In 1792 the joints, which had been swelled, began to sink; and the pain, which Simorre had borne with the dignity of a stoic, was lessened in the same proportion. He could now be moved without causing him much pain, and he was lifted up in one solid piece when it was necessary to make his bed; this, however, was only done once a month, and care was taken not to efface the hollow in which his body lay, as it would have been so painful to him to make another.

By examining the skeleton it will be seen that the right elbow was below the level of the trunk, that the spine was rather curved, and the pelvis raised in front—and that many precautions were requisite to prevent the weight of the body from resting on one part more than another. The legs formed an acute angle with the thighs, and the arms were nearly at right angles to the trunk. The fore-arms were bent upon the chest, and the wrists continually pressed upon it. The right hand was closed, and the left open. The fingers were separated, and anchylosed in that position; they were terminated by a nail or rather a horn about four inches long, and the same breadth; this was also the case in the toes. As he could not move his jaw he was obliged to suck in wine, and soup through his teeth. Two of his upper incisors were drawn, which enabled him to swallow more solid food, and to speak with greater ease. He was fed with minced meat, broths, and steeped bread; a reed was used to enable him to drink.

Though his condition was now improved, Simorre was yet in a state of continual suffering; he could not sleep for more than a quarter of an hour at once; but he was contented with his lot, and consoled himself with joyous sallies and humorous songs: for several successive years he printed an almanac of songs written at his dictation; and his indigence was alleviated by the sale of this little work. His songs breathed the soul of gaiety; and he painted his condition in them in such a manner as at once to excite compassion and laughter. The muscles of his face had acquired an extraordinary degree of mobility, being unceasingly in action, partly in order to supply the want of gestures in his conversation, and partly to

drive away insects by wrinkling up his skin. Simorre had a fine face, and a physiognomy full of hilarity and expression; his rich black hair covered a broad forehead which was bounded by his thick and arched eyebrows; he had an aquiline nose, and handsome eyes. He terminated his painful career in 1802, at the age of fifty. The approach of death did not shake the fortitude of which he had given so many proofs for twelve years; the serenity of his soul remained untroubled. The cheerfulness of this man under such a severe affliction offers an encouraging example both to those who suffer disease and pain, and those who are comparatively free from the heavier evils of mortality. There is no evil which cannot be made lighter by fortitude and resignation;—and too often imaginary calamities, or false apprehensions, produce more disquietude in the gloomy and impatient mind than even poor Simorre endured under his extraordinary deprivation.

Rational Amusement.—The love of literature has prevailed from very early times among the inhabitants of the remote island of Iceland. There, the way in which the evenings of their long winter are spent, furnishes a most agreeable contrast to the miserable pot-house debauchery which fills up the leisure of too many uncultivated Englishmen, and proves the value of well-regulated knowledge, as an auxiliary to virtue. A distinguished traveller, who spent a winter in Iceland, has described a winter evening in an Icelandic family, as rendered instructive and pleasing in the highest degree, by the prevailing love of useful knowledge among all ranks. As soon as the evening shuts in, the family assemble, master and mistress, children and servants. They all take their work in their hands, except one who acts as reader. Though they have very few printed books, numbers write excellently and copy out the numerous histories of their own island. The reader is frequently interrupted by the head of the family, or some of the more intelligent members, who make remarks and propose questions to exercise the ingenuity of the children or the servants. In this way the minds of all are improved in such a degree, "that," says my informant, "I have frequently been astonished at the familiarity with which many of these self-taught peasants have discoursed on subjects, which, in other countries, we should expect to hear discussed by those only who have devoted their lives to the study of science." Let me not omit to add, that the evening thus rationally and virtuously begun, is, by these well-instructed people, closed with an act of family devotion.

[From an excellent little work just published, 'Bullar's Hints and Cautions in the Pursuit of General Knowledge.']

The Capelin.—The shell-fish shops of London have lately exhibited an article of food which was previously little known in England—the dried capelin. As a relish for the breakfast-table, this production of the coasts of Newfoundland and Labrador is likely to become extensively used. A correspondent sends us the following notice of the fish, extracted from a 'Voyage in H. M. S. ship Rosamond to Newfoundland, by Lieut. E. Chappell, R. N. 1818:' "The cod are taken by hooks, baited either with *capelin* or *herrings*. The latter is a kind of fish well known in Europe: but the capelin seems to be peculiar to the coasts of Newfoundland and Labrador. As they are equally plentiful with the cod in those countries, and are, as a bait, so essentially necessary towards obtaining the latter, a short account of them may not be unacceptable to the reader, particularly as these fish have been strangely overlooked by the most distinguished naturalists.

"The capelin is a small and delicate species of fish, greatly resembling the smelt. It visits the shores we are describing about the months of August and September, for the evident purpose of depositing its spawn upon the sandy beaches. At such times, the swarms of these fish are so numerous that they darken the surface of the sea for miles in extent, whilst the cod prey upon them with the utmost voracity. The manner of the capelin's depositing its spawn is one of the most curious circumstances attending its natural history. The male fishes are somewhat larger than the female, and are provided also with a sort of ridge, projecting on each side of the back-bones, similar to the eaves of a house, in which the female capelin is deficient. The latter, on approaching the beach to deposit its spawn, is attended by two male fishes, who huddle the female between them, until her whole body is concealed under the projecting ridges before mentioned, and only her head is visible. In this state they run, all three together, with great swiftness upon the sands; when the males, by some imperceptible inherent power, compress the body of the female betwixt their own, so as to expel the spawn from an orifice near the tail. Having thus accomplished its delivery, the three capelin separate; and paddling with their whole force through the shallow surf of the beach, generally succeed in regaining, once more, the bosom of the deep.

"It is an entertaining sight, while standing upon the shore to observe myriads of these fishes, forsaking their own element, and running their bodies on the sand in all directions. Many of them find it totally impossible to return to the water and thus the beaches of Labrador are frequently covered with dead capelin. They have so little timidity, that when the author has waded into the sea, amidst a shoal of them, he has taken two or three at a time in his hands. Upon these occasions, he was enabled to ascertain beyond a doubt, that the evacuation of the spawn is caused by a compression on the part of the male; as, when thus taken in the hand, the female capelin invariably yielded up its spawn the instant that it received the slightest pressure from the fingers. The capelin are sometimes salted and dried by the fishermen, and afterwards toasted with butter for their breakfasts."

Quackery.—Dr. F——, a physician of Montpelier, was in the habit of employing a very ingenious artifice. When he came to a town where he was not known, he pretended to have lost his dog, and ordered the public crier to offer, with beat of drum, a reward of twenty-five louis to whoever should bring it to him. The crier took care to mention all the titles and academic honours of the doctor, as well as his place of residence. He soon became the talk of the town. "Do you know," says one, "that a famous physician has come here, a very clever fellow; he must be very rich, for he offers twenty-five louis for finding his dog." The dog was not found, but patients were.

New Way to get Practice.—A poor physician, with plenty of knowledge and no practice, imparted his troubles to one of his friends. "Listen to my advice," says the other, "and follow it. The *Café de la Régence* is in fashion; I play at chess there every day at two o'clock, when the crowd is thickest; come there too; do not recognise me, and do not speak a word, but seem in a reverie; take your coffee, and always give the waiter the money in a piece of rose-coloured paper: leave the rest to me." The physician followed his advice, and his oddity was soon remarked. His kind friend said to the customers of the coffee-house, "Gentlemen, do not think ill of this man because he seems an oddity; he is a profound practitioner; I have known him these fifteen years, and I could tell you of some wonderful cures that he has performed; but he thinks of nothing but his books, and never speaks except to his patients, which has prevented me from becoming intimate with him; but if ever I am obliged to keep my bed, he is the doctor for me." The friend went on in this way, varying the style of his panegyric from time to time, till by degrees all his auditors consulted the doctor with the rose-coloured paper.

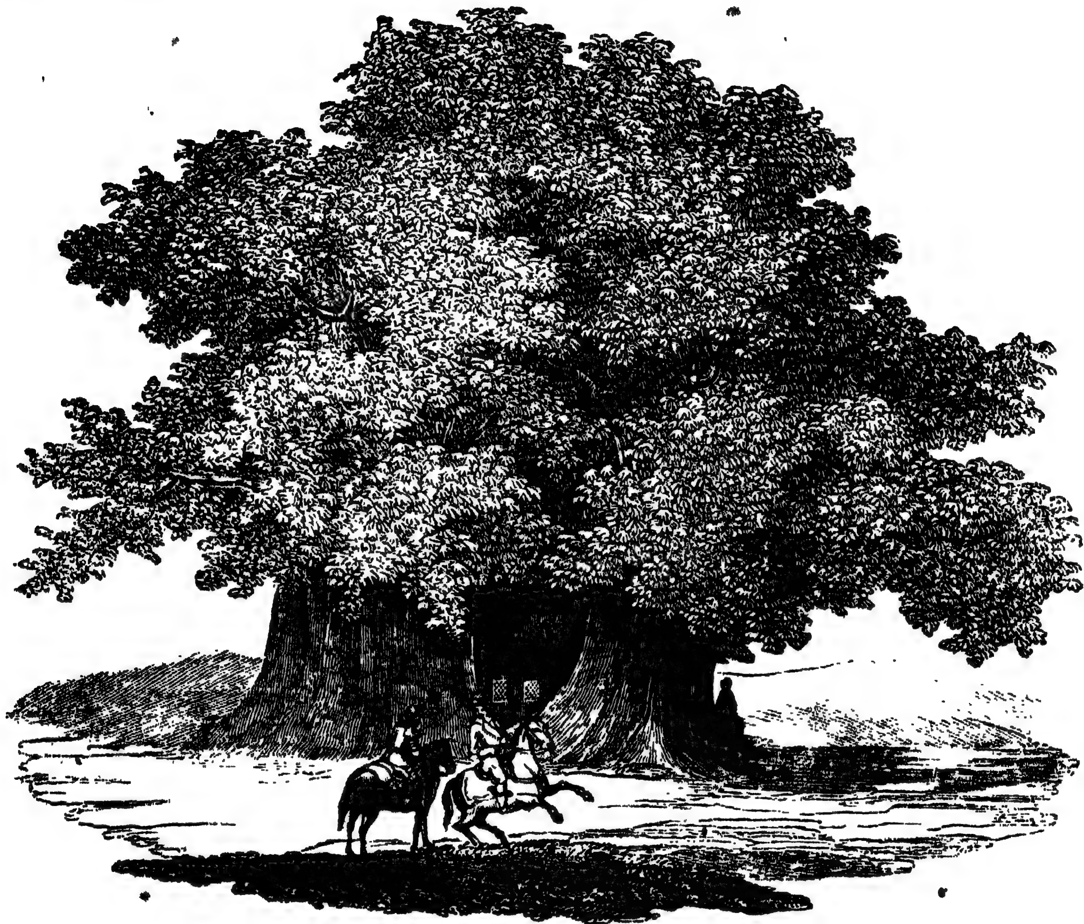
THE GIGANTIC CHESNUT TREE OF MOUNT ÆTNA.

One of the most celebrated trees in the world is the great chesnut tree of Mount Ætna, of which the following wood-cut is a representation, as it existed in 1784; it is known by the name of the *Castagno de' cento cavalli* (the Chesnut tree of a hundred horses). A tradition says, that Jane, queen of Arragon, on her voyage from Spain to Naples, landed in Sicily, for the purpose of visiting Mount Ætna; and that being overtaken by a storm, she and her hundred attendants on horseback found shelter within the enormous trunk of this celebrated tree. At any rate the name which it bears, whether the story be true or not, is expressive enough of its prodigious size.

We extract the following passage, descriptive of this tree, from the article "Ætna," in the Penny Cyclopædia:—

"It *appears to* consist of five large and two smaller trees, which, from the circumstance of the barks and boughs being all outside, are considered to have been one trunk originally. The largest trunk is thirty-eight feet in circumference, and the circuit of the whole five, measured just above the ground, is one hundred and sixty-three feet; it still bears rich foliage, and much small fruit, though the heart of the trunk is decayed, and a public road leads through it wide enough for two coaches to drive abreast. In the middle cavity a hut is built for the accommodation of those who collect and preserve the chesnuts.

"This is said, by the natives, to be 'the oldest of trees.' From the state of decay, it is impossible to have recourse to the usual mode of estimating the age of trees by counting the concentric rings of annual growth, and therefore no exact numerical expression can be assigned to the antiquity of this individual. That it may be some thousand years old is by no means improbable. Adanson examined in this manner a Baobab tree (*Adansonia digitata*) in Senegal, and inferred that it had attained the age of five thousand one hundred and fifty years; and De Candolle considers it not improbable that the celebrated Taxodium of Chapultopec, in Mexico (*Cupressus disticha*, Linn.), which is one hundred and seventeen feet in circumference, may be still more aged.'



[Great Chesnut Tree of Mount Ætna.]

It is evident that if the great chesnut tree were in reality a collection of trees, as it appears to be, the wonder of its size would at once be at an end. Brydone, who visited it in 1770, says—

"I own I was by no means struck with its appearance, as it does not seem to be one tree, but a bush of five large trees growing together. We complained to our guides of the imposition; when they unanimously assured us, that by the universal tradition, and even testimony of the country, all these were once united in one stem; that their grandfathers remembered this, when it was looked upon as the glory of the forest, and visited from all quarters; that for many years past it had been reduced to the venerable ruin we beheld. We began to examine it with more attention, and found that there was indeed an appearance as if these five trees had really been once united in one. The opening in the middle is at present prodigious; and it does indeed require faith to believe, that so vast a space was once occupied by solid timber. But there is no appearance of bark on the inside of any of the stumps, nor on the sides that are opposite to one another. I have since been told by the Canonico Recupero, an ingenious ecclesiastic of this place, that he was at the expense of carrying up peasants with tools to dig round the Castagno de' cento cavalli, and he assures me, upon his honour, that he found all these stems united below ground in one root."

Houel, in his 'Voyage Pittoresque des Isles de Sicile, tome ii. p. 79, 1784, has given a plate of this tree, from which the above cut is copied. He appears to have taken great pains to ascertain the fact of there being only one trunk, and to have completely satisfied himself that the apparent divisions have been produced, partly by the decay of time, and partly by the peasants continually cutting out portions of the wood and bark for fuel.

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NETLEY ABBEY.



[Ruins of Netley Abbey.]

Netley (or Nettley) Abbey, near Southampton, has long been celebrated as one of the most picturesque ruins in England. The proper name of the place appears, as Leland has noted it in his Collectanea (vol. i. p. 69), to be Lettelcy, which has been Latinized into *de Læto Loco* (pleasant place), if it be not, as has been most commonly supposed, a corruption of this Latin designation. Another abbey in the neighbourhood was, in the same manner, called *Beaulieu* in French or Norman, and *de Bello Loco* in Latin. The founder of Netley Abbey is stated by Leland to have been Peter Roche, Bishop of Winchester, who died in 1238. This account, however, is inconsistent with that of Tanner, who, on the authority of an ancient manuscript, gives 1239 as the date of the foundation. The first charter bears to be granted by Henry III. in 1251. The abbey is there called *Ecclesia Sanctæ Mariæ de loco Sancti Edwardi*, and, in conformity with this, another of the English names of the place is Edwardstow. The monks of Netley Abbey belonged to the severe order of the Cistertians, and were originally brought from the neighbouring house of Beaulieu. Hardly anything has been collected with regard to the establishment for the first three hundred years after its foundation, except the names of a few of the abbots. At the dissolution it consisted of an abbot and twelve monks, and its net revenue was returned at only

about £100. It appears, indeed, to have been always a humble and obscure establishment. In the valuation of Pope Nicholas IV., made towards the end of the thirteenth century, it is set down as having only an income of £17. Nor did the riches of the good monks consist in their library. Leland found them possessed of only one book, which was a copy of Cicero's Treatise on Rhetoric. In 1537 the place was granted by the King to Sir William Paulet, afterwards the celebrated Marquis of Winchester, who, according to his own account, was indebted for so much success in life to "being a willow, not an oak." From him, or his descendants, it passed to Edward Seymour, Earl of Hertford, the son of the Protector Somerset, who is said to have made it his residence. In a little work, entitled 'A Companion in a visit to Netley Abbey,' printed in 1800, there is an extract given from the parish register of St. Michael's, Southampton, from which it is inferred that Queen Elizabeth visited Lord Hertford in August, 1560; a circumstance not noticed in the elaborate account of her Majesty's 'Progresses,' published by the late Mr. Nicholls. It states that she came from the Castle of Netley to Southampton on the 13th, and went thence to Winchester on the 16th. The Abbey, it is supposed, at this time was known by the name of the Castle. About the end of the 17th century it became the property, it is said, of a Marquis of Huntingdon; but the Earl of Huntingdon must be meant, for there never was a marquis of that name. He has the credit of having commenced the desecration of the old building, by converting the nave of the church into a kitchen and offices. There is also a strange story in which he is implicated, told by Browne Willis, the antiquary, and the memory of which is still preserved by tradition in the neighbourhood. The Earl, it is said, about the year 1700, or soon after, made a contract with a Mr. Walter Taylor, a builder of Southampton, for the complete demolition of the abbey, it being intended by Taylor to employ the materials in erecting a town-house at Newport and other buildings. After making this agreement, however, Taylor dreamed, that as he was pulling down a particular window one of the stones forming the arch fell upon him and killed him. His dream impressed him so forcibly that he mentioned the circumstance to a friend (who is said to have been the father of the well-known Dr. Isaac Watts), and in some perplexity asked his advice. His friend thought it would be his safest course to have nothing to do with the affair respecting which he had been so alarmingly forewarned, and endeavoured to persuade him to desist from his intention. Taylor, however, at last decided upon paying no attention to his dream; and accordingly began his operations for the pulling down of the building, in which, however, he had not proceeded far, when, as he was assisting in the work, the arch of one of the windows, but not the one he had dreamed of, which was the east window, still standing, fell upon his head and fractured his skull. It was thought at first that the wound would not prove mortal; but it was aggravated through the unskilfulness of the surgeon, and the man died. It is very possible that the whole of this story may have originated from the single incident of Taylor having met with his death in the manner he did; the added circumstances of the previous dream, &c. are not beyond the licence of embellishment of which rumour and tradition are accustomed to avail themselves in such cases. The accident which befel Taylor, however, being popularly attributed to the special interposition of Heaven, is said to have for the time saved the abbey from demolition. But the place soon after passed out of the possession of the Earls of Huntingdon, and has since been successively in that of various other families. It is, or was lately, the property of Lady Holland, the widow of Sir Nathaniel Holland, Bart.

Netley Abbey is now a complete ruin, nothing remaining except a part of the bare walls. It stands on the declivity of a gentle elevation, which rises from the bank of the Southampton water. The walk to it from the town of Southampton, of about three miles in length, is one of enchanting beauty, the surrounding landscape being rich in all the charms of water and woodland scenery. The abbey itself is so embosomed among foliage,—partly that of the oaks and other trees which rise in thick clumps around it, and some of which, springing up from the midst of the roofless walls, spread their waving branches over them, and partly that of the luxuriant ivy which clothes a great part of the grey stone in green,—that scarcely a fragment of it is visible till the visitor has got close beside it. The site of the ruin, however, is one of considerable extent. Originally the buildings seem to have formed a quadrangular court or square; but scarcely any thing more is now to be seen, except the remains of the church or chapel which occupied one of the sides. It appears to have been about 200 feet in length, by 60 in breadth, and to have been crossed at the centre by a transept of 120 feet long. The walls can still be distinctly traced throughout the whole of this extent, except in the northern portion of the transept. The roof, however, as we have said, no longer exists, having fallen in about thirty or forty years ago. Its fragments, many of them sculptured with armorial bearings and other devices, lie scattered in heaps over the floor. Many broken columns still remain; and there are also windows in different portions of the wall, the ornamental parts of which are more or less defaced, but which still retain enough of their original character to show that the building must have been one of no common architectural beauty. The east end is the most entire, and the great window here is of elegant proportions, and elaborately finished. Besides the church, various other portions of the abbey, such as the kitchen, the refectory, &c. are usually pointed out to strangers; but the conjectures by which these apartments are identified must be considered as of very doubtful authority. The whole place appears to have been surrounded by a moat, of which traces are still discernible; and two large ponds still remain at a short distance from the buildings, which no doubt used to supply fish to the pious inmates. Their retired and undisturbed waters now present an aspect of solitude which is extremely beautiful, overhung as they are by trees and underwood. About two hundred feet distance from the west end of the church, and nearer the water, is a small building, called Netley Castle, or Fort, which was erected by Henry VIII.

But the chief attraction of Netley Abbey must be understood to consist, not so much in any architectural magnificence of which it has to boast, as in the singular loveliness of the spot, and in the feelings inspired by the overthrown and desolate state of the seat of ancient piety. No mind having any imagination, or feeling for the picturesque and the poetical, but must deeply feel the effect of its lonely and mournful, yet exquisitely beautiful seclusion. It has accordingly been the theme of many verses, among which an elegy, written by Mr. George Keate, the author of the Account of the Pelew Islands and Prince Le Boo, was at one time much admired. A living poet, the Reverend Mr. Bowles, has also addressed the ruin in some lines of considerable tenderness, which we shall subjoin:—

"Fallen pile! I ask not what has been thy fate;
But when the weak winds, wafted from the main,
Through each lone arch, like spirits that complain,
Come hollow to my ear, I meditate
On this world's passing pageant, and the lot
Of those who once might proudly, in their prime,
Have stood with giant port; till, bowed by time,
Or injury, their ancient boast forgot,
They might have sunk, like thee; though thus forlorn,
They lift their heads, with venerable hairs
Besprent, majestic yet, and as in scorn
Of mortal vanities and short lived cares;
E'en so dost thou, lifting thy forehead grey,
Smile at the tempest, and time's sweeping sway."

The Bible.—Sir W. Jones, a most accomplished scholar, who had made himself acquainted with eight and twenty languages, has left it on record, that amidst all his pursuits the study of the Sacred Volume had been his constant habit. Sir Isaac Newton, the greatest of mathematicians, was a diligent student of the Bible. Mr. Locke, a man of distinguished acuteness in the study of the human mind, wrote to recommend the study of the New Testament; as having "God for its author, salvation for its end, and truth unmixed with error, for its matter.' Milton, the greatest of poets, evidently had his mind most deeply imbued with the study of the word of God. Boerhaave, eminent as a natural philosopher, spent the first hour of every day in meditation on the sacred pages. Here no man can say that he has not leisure. A most beneficent institution of our Creator has given us, for this duty, a seventh part of our time, one day in every week, one whole year out of every seven.—*Bullar's Hints on the Pursuit of General Knowledge.*

Schools for Mechanics, &c.—The King of Bavaria issued a rescript in February last, directing the establishment of this description of popular schools in every quarter of his dominions, with the benevolent intention of affording the humblest workman an opportunity of receiving such instruction as may fit him for his calling. He permits the districts to name the masters of these schools for his approval. In large towns the course of instruction will take a wider range and be given in 'Colleges of Industry.'

The Sheep—heedlessness.—Cows and sheep possess much less of the instinctive apprehension of danger than horses. In a marshy country it is by no means uncommon for cows to be bemired, or *laired*, as it is termed in the northern counties; and this is still more common with sheep, though so much lighter in weight.

In mountainous and rocky districts the sheep is by no means to be trusted in places of danger, having none or little of the instinct which enables the goat and the chamois to make their way amongst the steepest precipices. It is remarkable that even upon seeing accidents befal their fellows they are not deterred from following heedlessly in the same track. The heedlessness of the animals in such cases, may probably arise from their being so much accustomed to follow others in the same track,—(a habit which causes a sheep-grazing district to be every where intersected with sheep-paths, about a foot in breadth,)—and when the leader falls over a precipice, the next follows in the same way, as Suwarrow's Russians marched into a trench till it was filled with their dead bodies.

ON THE PRODUCTION OF MANUSCRIPT BOOKS: AND THE OCCUPATIONS OF THE MONKS IN FORMER TIMES.

There is scarcely any error so popular, yet so unfounded, as that which invariably attributes unbounded indolence to the monastic orders of former days. To them we owe the preservation of literature, both in the pains they took to perpetuate history by their labours in transcribing, and by their diligence in the education of youth. In the larger monasteries a chamber was almost always set apart for writing, allowing room in the same apartment for other quiet employments also. The transcribers were superintended by the abbot, prior, sub-prior, and precentor of the convent, and were distinguished by the name of *Antiquarii*. These industrious persons were continually occupied in making new copies of old books, for the use of monasteries; and by this means many of our most valuable historical records were preserved. The learned Selden owed much of the information which he gave to the world, concerning the ancient dominion of the narrow seas, to monastic documents.

The Anglo-Saxon Monks were most celebrated as writers, and were the originators of the small Roman letter used in modern times. The greatest delicacy and nicety were deemed essential in the transcribing of books, whether for the purposes of general instruction, or for the use of the convents themselves. Careless and illegible writing is therefore but seldom to be met with among the remains of monastic industry; and when erasures were made, they appear to have been done with the utmost care and skill. For this purpose the Monks used pumice-stone; and they were also provided with a punctorium or awl, to make the dots, and with metal pens for writing, until after the seventh century, when quills were brought into use for pens. Ink, composed of soot, or ivory-black with gum, was used upon the vellum, for paper was not introduced until the tenth century. Hence the beautiful distinctness, as well as durability, of very ancient manuscript books. Indeed, such an important art was writing in those days considered, that Du Cange enumerates as many as a hundred different styles of writing in vogue among the learned.

With so many impediments to the multiplication of books as were attendant upon their slow production in this manner, it is not a matter of surprise that the Monks enjoyed almost a monopoly of this kind of labour, as, in truth, they were the only body of men who could properly conduct it. The expense of books was proverbially great, and large estates were frequently set apart for the purpose of purchasing them. In addition to the cost of transcribing, the materials of which books were composed were sources of great expense. The leaves were, in many instances, composed of purple vellum, for the purpose of showing off to more advantage letters of gold and silver. The binding was often very gorgeous, although of a very rude construction. The most prevailing sort of covering for books was a rough white sheep-skin, pasted on a wooden board, with immense bosses of brass; but the exterior of those intended for the church service was inlaid with gold, relics, or silver or ivory plates. Some books had leaden covers, and some had wooden leaves; but, even so early as the time of Froissart, binding in velvet, with silver clasps and studs, began to be adopted in presents to any very exalted personage. Illuminating manuscripts was also another occupation of the Monks of the middle ages, although not confined to them, for the greatest painters of the day disdained not to contribute to these cumbrous and sometimes confused decorations. The art of correct drawing, and a knowledge of perspective, cannot, however, be traced in the generality of the fantastic pictures by which illuminated books are adorned. Colouring and gilding appear to have been the chief points to which the attention of the illuminators was directed. The neutral tint was first laid on somewhat in the same mode as in the present day, some portions being left untouched in order to be afterwards embedded in gold and silver. The pictures represented different subjects, according to the nature of the book which they were intended to embellish. The title on the pages was formed of capital letters of gold and azure mixed. Illuminated pictures are of a dazzling brightness; the white predominating, which, not being an oil colour, reflects the rays of light, and does not absorb them. So much custom had the Monks in their labours of transcribing and illuminating, that they were sometimes obliged to introduce hired limners, although contrary to the monastic rule in general; but such aids were seldom resorted to, the Monks being usually the only labourers. The invention of printing diminished the importance and annihilated the profits of writing; and, in 1460, that of engraving superseded the art of illuminating. The last specimen of this latter practice is to be met with at Oxford, in the Lectionary, or Code of Lessons for the Year, composed for Cardinal Wolsey. The achievement of this work, so long after printing and engraving had become popular, evinces how reluctant that great and splendid prelate was to relinquish a mode of framing books, which was certainly calculated to give them, in the eyes of the vulgar an attractive and costly character. Illuminating is supposed to have originated from the necessity of rendering the means of knowledge attractive first to the senses, in those days of comparative darkness and ignorance.

Besides transcribing and illuminating, the Monks excelled in sculpture and painting, turning, carpentry

jewellery, and goldsmith's work. Thomas de Bamburgh, a monk, of Durham, was even employed to make two great warlike engines for the defence of the town of Berwick; and an astronomical clock, made by Lightfoot, a monk, of Glastonbury, in 1325, is still preserved at Wells. Music, which Fuller, in his Church History, observes to "have sung its own dirge at the Reformation," was sedulously cultivated in monastic institutions; and the Monks skilled in that accomplishment went from monastery to monastery, in order to disseminate their instructions.

Much might be said concerning the indefatigable attention paid by this class of men to the education of youth. This was a department in which, according to the notions of the time, they eminently excelled. In compliance with the prevalent superstitions, the learning of the service and rule of their respective orders was, it is true, the first point to be accomplished in the instruction of their pupils, the novices. These individuals, most of whom entered young, were required to commit the Psalter to memory, without deviating from a single word in the original; a painful exercise, which was the occupation of hours passed in the solitude of the cell. Latin, essential because the language of the Breviary, was an object of incessant study, as well as French, which the Norman Conquest had introduced into common use in this country. To these studies were added writing and accounts, and several of the mechanical arts, besides some initiation into the popular pastimes of the day, and hunting, which was deemed salutary to the health. Probably more attention was paid to dexterity in these arts and accomplishments, than to the actual culture of the understanding. The Monks, though preeminent in architecture, as well as in most of the arts of life, made but little figure in literature, considering the leisure and opportunities which they enjoyed. For this the routine-like nature of their existence may, in some degree, account. Nothing is so likely to damp the ardour of genius as a continual succession of formal observances, which dissipate the thoughts from any one great object. The minds of these recluses were also narrowed by localities. Pent up from general society, and in a small sphere, the interests, and often the contentions which agitated their respective convents, became of paramount importance to them, and were mingled even with their historical records, with a degree of tasteless and absurd prolixity, which has much lessened the value of the few original works which they composed.

WARS WITH THE WILD BEASTS.



[Lion springing from Coven. See p. 141.]

THE LION.

[The following are in continuation of the Sketches of a South-African Settler.]

In our journey from Algoa Bay to our location of Glen-Lynden, or Baviaan's River, we had occasionally seen in the distance herds of large game, chiefly of the antelope tribe; and we found our highland valley to be pretty well stocked with quaggas, hartebeests, reeboks, rietboks, oribis, klipspringers, wild hogs, and a variety of smaller animals. But we had as yet seen none of the beasts of prey that inhabit the country, with the exception of one or two jackals, although we had once heard the *gurr* of the Cape tiger (or leopard), and been serenaded nightly by the hungry howl of the hyæna, almost all the way from the coast. We were not allowed, however, to continue long without a closer acquaintance with our neighbours of the carnivorous class. The lion introduced himself, in a mode becoming his rank and character, a few nights after our arrival at Glen-Lynden.

The serene weather with which we had been favoured

during our journey, was succeeded on the 3d of July (the day after our first sabbath meeting) by a cold and wet evening. The night was extremely dark, and the rain fell so heavily that, in spite of the abundant supply of dry firewood which we had luckily provided, it was not without difficulty that we could keep one large watch-fire burning. Having appointed our watch for the night (a service which all the male adults, masters as well as servants, agreed to undertake in rotation), we had retired to rest, and, excepting our sentinel, were all buried in sleep, when about midnight we were suddenly roused by the roar of a lion close to our tents. It was so loud and tremendous that for a moment I actually thought that a thunder cloud had broken close beside us. But the peculiar *expression* of the sound—the voice of fury as well as of power—instantly undeceived me; and instinctively snatching my loaded gun from the tent pole, I hurried out—fancying that the savage beast was about to break into our camp. Most of our men had sprung to their arms, and were hastening to the watch-fire, with a similar apprehension. But all around was complete darkness; and scarcely two of us were agreed as to the quarter whence the voice had issued. This uncertainty was occasioned partly, perhaps, by the peculiar mode this animal often has of placing his mouth near the ground when he roars, so that the voice rolls, as at were, like a breaker along the earth; partly, also, to the echo from a rock which rose abruptly on the opposite bank of the river; and, more than all, to the confusion of our senses in being thus hurriedly and fearfully aroused from our slumbers. Had any one retained self-possession sufficient to have quietly noted our looks on this occasion, I suspect he would have seen a laughable array of pale or startled visages. The reader who has only heard the roar of the lion at the Zoological Gardens, can have but a faint conception of the same animal's voice in his state of freedom and uncontrolled power. Novelty in our case gave it double effect, on our thus hearing it for the first time in the heart of the wilderness. Having fired several volleys in all directions round our encampment, we roused up the half-extinguished fire to a blaze, and then flung the flaming brands among the surrounding trees and bushes. And this unwonted display probably daunted our grim visitor, for he gave us no further disturbance that night.

A few days afterwards some of our people had a daylight interview with a lion—probably the same individual who had given us this boisterous greeting. They had gone a mile or two up the valley to cut reeds for thatching the temporary huts which we proposed to erect by the combined labour of the party, and were busy with their sickles in the bed of the river, when, to their dismay, a huge lion rose up among the reeds, almost close beside them. He leaped upon the bank, and then turned round and gazed steadfastly at them. One or two men who had guns, seized them hastily and began to load with ball. The rest, unarmed and helpless, stood petrified; and had the lion been so disposed he might easily have made sad havock among them. He was, however, very civil—or, to speak more correctly, he was probably as much surprised as they were. After quietly gazing for a minute or two at the intruders on his wild domain, he turned about and retired, first slowly, and then, after he was some distance off, at a good round trot. They prudently did not attempt to interfere with his retreat.

After this, when we had moved our encampment farther up the valley, and had exchanged our tents for temporary reed-covered cabins, we were visited, during the winter and ensuing spring, several times by lions, but without our ever coming into actual conflict with them. On one of those occasions a lion and lioness had very nearly carried off, in a dark night, some of our horses, but were scared by a firebrand when within a few yards of their prey. It is worthy of remark, that the lion always prefers a horse to an ox when he has the choice. After we had got some Hottentots beside us, we rode out, after some of those alarms, to hunt these formidable visitors, but without being able to discover their coverts.

The first actual rencontre occurred while I was absent from the settlement, on a visit to our district magistrate. The following were the circumstances, as detailed to me by the parties present. A horse was missing, belonging to Mr. George Rennie, a young farmer of our party (descended from the same family in East Lothian as the celebrated engineer of that name); and, after some search, it was discovered by the foot-prints to have been killed by a lion. The boldest men of the settlement having assembled to give battle to the spoiler, he was traced without difficulty by the Hottentots to a secluded spot, about a mile or upwards from the place where he had seized his prey. He had carried it with him to devour it at his leisure, as is the usual practice of this powerful animal. On the approach of the hunters, the lion, after some little demur, retreated to a small thicket in a shallow ravine at no great distance. The huntsmen followed cautiously, and having taken post on a height adjoining the ravine, poured volley after volley into the thicket. This bombardment produced no perceptible effect; the lion kept under covert and refused to give battle; only when the wolf-hounds were sent in to tease him, he drove them forth again with a savage growl, and a bloody scratch or two from his claws. At length, Mr. Rennie, the leader of the hunt, and a man of daring hardihood, losing patience at this fruitless proceeding, descended from the height, and approaching the thicket, threw several large stones into the midst of it. This rash bravado brought forth the lion. He sprung fiercely from his covert, and with another bound or two would probably have had our friend prostrate under his paw, but most fortunately at this critical moment, the attention of the savage beast was attracted by a favourite dog of Mr. Rennie's, which ran boldly up to the lion and barked in his face. The poor dog was destroyed in a moment: a single blow from the lion's paw rewarded his generous devotion with death. But that instant was sufficient to save his master. Mr. Rennie had instinctively sprung back a pace or two, and his comrades on the rock fired at once with effect. The lion fell dead upon the spot, several balls having passed through his body.

The next serious rencontre that we had with the monarch of the wilderness occurred a considerable time afterwards, when the several families of our party had taken possession of their separate allotments, and our temporary encampment was broken up. I happened then to be residing with my family, and a few Hottentot servants, at a place to which, from the picturesque forms of the adjacent mountains, we had given the Scottish name of Eildon. My next neighbour, at that time, was Captain Cameron, a Scotch officer who had lately come to occupy the farm immediately below me on the river. I had gone one evening down with another gentleman and two or three female relatives to drink tea with Captain Cameron's family. The distance being scarcely four miles, we considered ourselves, in that thinly peopled country, next-door neighbours; and, as the weather was fine we agreed to ride home by moonlight—no lions having been seen or traced in the valley for nearly twelve months. We returned accordingly, jesting as we rode along about wild beasts and Caffers. That part of the valley we were passing through is very wild, and encumbered in several places with jungles and thickets of evergreens; but we had no suspicion at the moment of what afterwards appeared to be the fact—that a lion was actually dogging us through the bushes the whole way home. Happily for us, however, he did not then show himself, nor give us any indication of his presence; being probably somewhat scared by our number, and the white dresses of the ladies glancing in the moonlight.

About midnight, however, I was awakened by an unusual noise in my *kraal*, or cattle-fold, close behind my cabin. Looking out, I saw the whole of the horned cattle springing wildly over the high thorn fence, and scampering round my hut. Fancying that a hyæna, which I had heard howling when I went to bed, had alarmed the animals by breaking into the kraal, I seized my gun, and sallied forth in my shirt to have a shot at it. Though the cloudless full moon shone with a brilliant light (so bright in that fine climate that I have frequently read print by it), I could discover no cause for the terror of the cattle, and after calling a Hottentot to shut them again into the kraal, I retired once more to rest. Next morning, Captain Cameron rode up to inform me that herdsmen had discovered by the traces in the path, that a large lion had followed us up the valley the preceding night; and, upon further search, it was ascertained that this unwelcome visitant had actually been in my kraal the preceding night, and had carried off a couple of sheep. But as he appeared by the traces (which our Hottentots followed with wonderful dexterity) to have retreated with his prey to the mountains, we abandoned for the moment all idea of pursuing him.

The lion was not disposed, however, to have done with us on such easy terms. He returned that very night, and killed my favourite riding-horse, little more than a hundred yards from the door of my cabin. I then considered it full time to take prompt measures in self-defence; and sent a messenger round the location to call out the neighbours to hunt him, being assured by my Hottentots that, as he had only devoured a small portion of the horse, he would certainly be lurking in the immediate vicinity. The huntsmen speedily assembled, and, with the aid of the Hottentots, we soon discovered the lion in covert, about a mile from the spot. The scene that followed resembled very closely, in many particulars, the adventure of Mr. George Rennie on the occasion already described. The lion, on this occasion also, refused to leave the covert. Mr. Rennie and his brother John, and another Scotchman, with three mulatto Hottentots, went into the jungle to attack him. He then sprung out in a fury, and gave battle to the assailants—struck down John Rennie, and placed his foot upon him, and looked round upon us most majestically for a few seconds, as if considering whether he should tear a few of us to pieces or not. Seeing us a numerous band (there were seventeen of us) he seemed to judge we were too many for him; and so, leaving our fallen friend with no further injury than the marks of his five claws about half an inch into his flesh, he bounded from the thicket, and retreated up Glen-Douglas towards the Caffer mountains. We pursued him hotly up the glen, and our wolf-hounds held him at bay under a mimosa tree till we intercepted his path, seized the heights around, and shot him dead, without again venturing within reach of his claws. He was a fine full grown lion of the yellow variety; and, in memorial of our African exploits, the skin and skull were sent as a small token of kindness and respect to Sir Walter Scott, and now form part of the ornaments of the lamented poet's armoury at Abbotsford. A more detailed account of this lion hunt may be found in 'The Library of Entertaining Knowledge;' Menageries, vol. I. page 162.

MINERAL KINGDOM.—Section 6.

The Secondary Rocks comprehend a great variety of different beds of stone, extending from the primary strata to the chalk, which forms the upper or most recent member of the divison. There are certain principal groups, which are divisible into subordinate beds, all distinguishable by marked peculiar characters. They are in the following descending order:—

The Chalk Group.
The Oolite Group.
The Red Marl Group.
The Coal Group.
The Mountain Limestone Group.
The Old Red Sandstone Group.
The Grauwacke Group.

We shall briefly describe the leading characters of each group, but in an *ascending* order, from the grauwacke, a German local name for the principal rock among the lowest members of the secondary series, which we described in our last section as lying upon the primary strata. This group occurs extensively in the hilly country of the south of Scotland, in Westmoreland, Wales, and Devonshire. The *Old Red Sandstone Group* is characterized by its containing a great number of beds composed of water-worn fragments, and sandstone layers of a fine grain, and by its being usually of a deep red colour. It contains very few organic remains, but terrestrial plants and marine shells are sometimes found in it. It is the principal rock in Herefordshire, but is not of very great extent in other parts of England; it is estimated to be in England about 1500 feet thick. It must not be confounded with another red sandstone which covers a great extent of the midland and northern counties of England, and which belongs to a more recent period, viz., the *Red Marl Group*. Above the old red sandstone comes an important suite of beds, the *Mountain Limestone Group*. The limestone is usually very compact or crystalline, yielding in many places excellent marbles for chimney-pieces, &c. It contains a great variety of organic remains, consisting of corals and many species of zoophytes and other radiated animals, some species of crustacea, a few remains of fish, and a great variety of marine shells. It forms considerable mountain chains in the north of England, Derbyshire, and Somersetshire, and abounds in many places in valuable ores of lead; it is estimated to have a thickness of 900 feet. Above this limestone comes the important group containing our coal mines. As this group will form the subject of a special article, we shall not say more about it at present than to remark, that it must have been produced under very different circumstances from the limestone which it covers, for it rarely contains any marine remains, but a vast profusion of plants of many genera and species. The united thickness of the Coal Group is, probably, not less than 1700 feet. The *Red Marl Group* consists of a number of beds of a red marly sandstone, often variegated by stripes and patches of grey, blue, and white, which occupy a great extent of country in England; there is an almost uninterrupted line of it from Hartlepool, in the county of Durham, to Exeter, and it covers the greater part of Nottinghamshire, Warwickshire, Staffordshire, Shropshire, Worcestershire, and Cheshire. In the two last counties it contains valuable mines of common salt, and copious brine-springs of the same, and in other places great quantities of alabaster or plaster-stone. In this group are found considerable beds of limestone of a peculiar quality, from containing a large proportion of the earth, called magnesia. The sandstones of the group contain very few organic remains, but the limestones abound in those of marine animals, among which have been found the bones of gigantic amphibious reptiles like crocodiles. The group is estimated at not less than 2100 feet of thickness. The *Oolite Group* is so called from the prevalence in it of a kind of limestone composed of small round grains, like the eggs in the roe of a fish, whence oolite, from two Greek words signifying egg and stone. It contains about twelve alternations of subordinate beds, or rather systems of beds, consisting of limestones of different qualities and of clays, their united thickness being about 2600 feet, of which 1100 are formed by two beds of clay of 500 and 600 feet each. The whole

group contains a vast abundance of animal remains, which are almost exclusively marine, consisting of numerous genera and species of the molluscous animals, crustacea, insects, echini, zoophytes, and skeletons of several species of gigantic reptiles analogous to the crocodile. The celebrated stones of Bath, Ketton, and Portland, and most of the best building stones of the middle and south of England, are found in this group, which covers a great part of the country that lies between a line drawn from the mouth of the river Tees to Watchet, on the south coast of the Bristol Channel, and another line drawn from Lynn in Norfolk, to Poole in Dorsetshire. The last or uppermost of the secondary rocks is the *Chalk Group*, which is separated from the Oolite Group by several beds of sands, clays, and sandstones, and including these, has been estimated to be 1900 feet thick. It is unnecessary to say any thing of the composition of the principal member of the group, as it must be so familiar to all our readers. It covers a great extent of country, forming low hills and downs from Flamborough Head in Yorkshire to Weymouth, in a curvilinear sweep, the convexity directed to the S.E., and in many places E.S.E., and S. of that line. The whole group abounds in organic remains of the same *classes* as those found in the Oolite Group below.

It thus appears that the secondary rocks consist of an extensive series of strata, of limestones, sandstones, and clays, all of which contain either rounded fragments of pre-existing rocks or organic remains, or both; and each group, and all the subordinate members of the groups, are distinguishable by characters of great constancy and certainty, derived from the peculiar nature of the included fossils. They must all have been deposited in an horizontal position, but there are parts of them which have undergone greater or less disturbance, being often thrown into a vertical position, and broken, twisted, and disturbed in the most extraordinary manner. Many of the disturbances of the lower groups took place prior to the deposition of the upper; for the latter are found lying in unconformable stratification on the ends of the former as represented in diagram No. 5, Section IV. (p. 87.) They are traversed by veins or dykes, as they are often termed, of whinstone and other unstratified rocks, and there is usually great disturbance of the strata when these occur, the dykes are often of great magnitude, and the rock is frequently thrust in huge wedge-shaped masses, of miles in superficial dimensions and some hundred feet thick, between the regular strata. After the deposit of the secondary rocks a remarkable change took place, for all the strata that lie above the chalk have a totally different character from that rock and all below it. They have been classed together in one great division, and have been designated the Tertiary Rocks. Thus the whole series of strata, of which the crust of the globe is composed, is divided into the *Primary*, the *Secondary*, and the *Tertiary*. It is evident that at the time the secondary rocks were deposited, a great part of the present continent of Europe must have been considerably lower than the present level of the sea, that when the oldest or lowest members of the series were forming, the summits of the mountain ridges of primary rocks rose as islands of different magnitudes from the bosom of the deep, that at several successive periods these islands were more elevated, and attained consequently a greater superficial extent, the newer formed strata occupying the lower levels. In the progress of this series of changes of the surface of the globe, when there were evidently occasional depressions of the land as well as elevations, there appear to have been formed basin-shaped cavities or troughs, not entirely cut off from communication with the sea, and vast estuaries, in which the tertiary strata were deposited. While the secondary strata stretch continuously for hundreds of leagues, the tertiary are found only in detached, insulated spots of comparatively limited extent. In this state of the earth's surface there must have been vast inland fresh water lakes, for we find regularly stratified deposits of great thickness full of organic remains, which exclusively belong to animals that lived in fresh water, and to terrestrial animals and plants. Like the secondary, the tertiary rocks consist of a great variety of strata of limestones, sandstones, clays, and sands, which have distinct characters, and have been united in several groups. In them we first discover the remains of land quadrupeds and birds, and bones of mammalia are most abundant in the beds nearest to the surface. Among all the various remains of animals and plants that are found in the secondary rocks from the chalk downwards, not one has been found which is identical with any living species. Although they have characters agreeing with those by which existing animals have been grouped together in the greater divisions of genera, families and classes, the living individuals of the same divisions have forms of structure distinct from any found in a fossil state in the secondary rocks. But with the tertiary strata a new order of things commences, for in the lowest of these a small proportion, about three and a half per cent., of the fossil shells cannot be distinguished from species that now exist; as we approach the higher beds the proportion always increases, and in the most recent stratum, it amounts to nine-tenths of the whole. It is not more than twenty-one years since the great division of the tertiary rocks was established; prior to that time the peculiar characters which separate them from the secondary strata had been entirely overlooked, a circumstance which marks very strongly that geology is the youngest of the sciences. The discovery was made by the celebrated Cuvier and his associate M. Brongniart, who found that the city of Paris was built in a hollow basin of chalk that had been subsequently partially filled by vast deposits of clays, limestones, sands, and sandstones, and that there were alternations of beds containing remains of fresh water and terrestrial animals and plants, with others containing only the remains of marine animals. The publication of the work of the French naturalists led to a similar discovery in our own island, and singularly enough in the valley of the Thames, so that the capitals of France and England are both built upon these strata, so strangely neglected for so long a time, although occurring in the very spots where the greatest numbers of scientific men are collected together in both countries. A series of tertiary strata was discovered by Mr. Webster in the Isle of Wight, having strong points of resemblance with that of the environs of Paris, and these with some partial deposits on the coasts of Suffolk and Lancashire, constitute the whole of the tertiary rocks found in Great Britain. It was for some time supposed that these newer strata, which were soon found not to be confined to the neighbourhood of Paris and London, extended like the secondary rocks over great tracts of country; and that there was such a degree of uniformity in their characters, that deposits widely distant from each other could be recognised as belonging to the same period in the chronological order of succession of the strata. Later observations, however, have shown that although possessing a general character of resemblance, they have been so much modified in their formation by local circumstances, that no two tertiary deposits, even of the same era, are alike. The discoveries of the last few years have led geologists to establish distinct subordinate groups, as in the case of the secondary rocks, and the upper stratum of the Paris basin, which was at one time considered the most recent of stratified rocks, has been found to be inferior in the order of succession to many others, some thousand feet thick. Organic remains are the great characters of distinction, and Mr. Lyell, in his 'Principles of Geology,' has proposed a division of the series founded upon the proportion of shells contained in the stratum which are identical with living species; that stratum being the most modern where the proportion is greatest.

CAMPHOR.



[Camphor Tree.]

Camphor, which is so much used for medical purposes, is likewise extensively employed in the composition of varnishes, especially in that of copal. It is the peculiar product of the root of a species of laurel (*laurus camphorata*), a tree growing in China, Japan, and several parts of India. The leaves of this plant stand upon a slender footstalk, and have an entire undulated margin running out into a point. Their upper surface is of a lively and shining green; the under part is of a yellower green, and of a silky appearance; a few lateral nerves curve towards the margin, frequently terminating in small worts or excrescences—a circumstance peculiar to this species of laurel. The footstalks of the flowers do not come forth until the tree has attained considerable age and size. The flower stalks are slender, and branch at the top, dividing into very short stems, each supporting a single flower. This is white, and succeeded by a shining purple berry of the size of a pea. It is composed of a small kernel enclosed in a soft pulpy substance—having the aroma of cloves and camphor. The bark of the stem of the tree is outwardly somewhat rough; but on the inner surface it is smooth and mucous, and therefore readily separated from the wood, which is dry and of a white colour. Some travellers affirm that old trees contain camphor so abundantly that on splitting the trunk it is found in the form of large tears, so pure as not to require rectification. The usual method, however, of obtaining this substance is from the roots, pieces of which are put into an iron vessel furnished with a capital, or large head; this upper part is internally filled with cords of rice straw; the joinings are then luted, and the distillation proceeded upon. On the application of heat the camphor sublimes and attaches itself to the straw within the head. The Dutch purify the substance thus obtained by mixing an ounce of quicklime with every pound of the camphor, and subjecting it to a second sublimation in large glass vessels.

Camphor is well known as a white friable substance, having a peculiar aromatic odour, and a strong taste. Some chemists consider it as a concrete vegetable oil. It melts at a temperature of 288°, and boils at 400° Fahrenheit. Its specific gravity is less than that of water. It is very inflammable, burning with a white flame and smoke, and leaving no residue. Alcohol, ether, and oils dissolve it. The only indication whereby it appears that water acts upon camphor is that of acquiring its smell; it is said, however, that a Spanish surgeon has effected the solution in water by means of carbonic acid*. Camphor may be burned as it floats on the surface of water. It is not altered by mere exposure to atmospheric air, but it is so extremely volatile that if in warm weather it is placed in an open vessel it evaporates completely. It dissolves in alcohol, and like the resins, is immediately precipitated again by the addition of water.

Camphor has been found to exist in numerous plants whence it may be obtained by distillation. Neumann and other chemists extracted it from the roots of zedoary, thyme, sage, the inula helenium, the anemone, the pasque flower, and some other vegetables. Experiment has shown that the plants whence it is extracted afford a much larger quantity of camphor when the sap has been suffered to pass to the concrete state by several months' drying.

This substance was very early known to the Eastern nations; it was introduced into Europe by the Arabians, but was entirely unknown to the ancient Greeks and Romans.

* Ure's Dictionary of Chemistry.

Rabbits.—The care with which a doe rabbit provides for her young is very remarkable. She not only makes a nest of the softest hay, from which she carefully munches out all the harder portions, but she actually strips the fur or down off her own breast to spread over the hay. At first she covers up her young ones with the same materials in order to keep them warm, uncovering them only for the purpose of giving them suck. She is also extremely careful in proportioning this covering to the severity of the weather and the tenderness or strength of her offspring, gradually diminishing it as they grow more robust.

The Horse—instinct.—A horse before venturing up a leap measures the distance with his eye, and will not make the attempt if he think he cannot clear it. (*Dr. Haslam on Sound Mind.*) In alpine countries the horses accustomed to the difficult passes in the mountains seldom make a false step or trust themselves on a place where their footing is insecure. In the same way the horses accustomed to a marshy country may be safely trusted in crossing bogs and roads, as they rarely venture upon any spot where they may be in danger of being mired.

Some time ago there was a horse in the artillery stud at Woolwich which was (while in the riding-school) the most docile and finely trained animal that could be imagined. He would at the word of command lie down and not rise till he was ordered: he would bow with the most dignified grace to visitors; and perform other feats with undeviating obedience. But the instant he was taken out of doors, and found himself in the open air and the open roads, he became altogether unmanageable;' and when he could not cast his rider, which he did all he could to effect, he lay down and rolled about. It may be remarked, that when first purchased he was found to be extremely vicious, but being a fine horse pains were taken to break him in—and as it appears successfully—within the walls of the riding-school, though out of doors his old habits remained unbroken.

Musical Taste.—The ass has been frequently made one of the parties in the most popular fables from Æsop downwards. The following is not much known: A trial of skill in singing being agreed on between the cuckoo and the nightingale, the ass was chosen as umpire. After each had done his best, the sagacious ass declared that the nightingale sung extremely well; but for a good plain song the cuckoo was far his superior.—*Scots' Presbyterian Eloq. Displayed.*

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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EDINBURGH CASTLE.



[Edinburgh Castle.]

It is scarcely possible to imagine a finer situation for a city than that of the Scottish metropolis. Let the reader conceive a vast natural amphitheatre, formed by a succession of elevations sweeping around the east, south, and west, and endlessly varied in their aspect by distance, height, and the verdant or rocky termination of their ridges or pinnacles; while on the low space in front spreads the noble estuary of the Forth, with the bright green banks of the opposite coast of Fife glittering across its waters, and the loftier mountains bounding the horizon beyond. In the centre of this magnificent panorama is the ancient capital, occupying the summit of a long hill, which stretches across a portion of the enclosed valley, and ascends gradually from the east till it terminates at the opposite point in a precipitous rock of nearly two hundred feet in height. On this rock stands

the castle. It is separated from the High-street, or principal part of what is called the Old Town, by a vacant space of about three hundred feet in length, forming the brow of what is called the Castle Hill, the only practicable ascent to the fort. Beyond this the High-street extends along the declivity in a straight line of more than a mile in length, with the palace of Holyrood at its extremity. Down the sides of the hill on each side run numerous steep and narrow lanes, or *closes*, as they are called, issuing into the low street called the Cowgate on the south, and on the opposite side leading to what still bears the name of the North Loch, though the basin which used to be filled with water has now been long drained. For the purposes of communication between the different districts of the town, both the Cowgate and the North Loch are crossed by bridges, that over the latter being nearly seventy feet in height. Beyond the North Loch lies the more modern part of the city, called the New Town, which is laid out in spacious streets, squares, and circuses. The most distant part of the New Town stands about three miles from the sea, but it is fast covering the intervening space. To the east of the city rises the Calton Hill, an eminence of considerable height. Beyond it, to the south-west, are the green peak of Arthur's Seat, and the singularly rocky coronet of Salisbury Crags. Bounding the back-ground to the south is the long line of the Pentlands, and the hills of Braid; and, finally, to the west, lies the beautiful hill of Corstorphine, swelling from amidst cultivated fields and woodlands, and, when lighted up by the setting sun, forming as rich a picture as the eye has often looked upon.

But our business at present is with what Scott has so enthusiastically apostrophized as

"The height
Where the huge Castle holds its state,
And all the steep slope down,
Whose ridgy back heaves to the sky,
Piled deep and massy, close and high,
Mine own romantic town."

There can be no doubt that the town of Edinburgh originated in a fort which occupied the position of the present castle. It appears to have been a strong hold of the British tribe called the Gadeni, and to have been named in their language the May-Dyn. In after-times, when this was conceived to be a Saxon term, the expression Maiden Castle came into use, and Edinburgh has even been denominated in charters, *Castrum Puellarum* (the fort of the girls or maids). To account for this name, historians and etymologists have indulged in many fanciful conjectures. But the true meaning of the British term May-Dyn (of which the Maiden Castle is a vulgar corruption) is, as Mr. Chalmers has shown in his Caledonia, merely the fort or fortified mount in the plain, —a description exactly applicable to the original Edinburgh, as well as to other places anciently distinguished by the same name.

The modern name of Edinburgh comes from Edwin, one of the sovereigns of the Saxon kingdom of Northumberland, of which for a long period what is now called Scotland, as far as the Frith of Forth, was a part. Edwin reigned from 617 to 634; and to that age therefore we are to assign the first imposition of the name. From this has been formed the modern Celtic or Gaelic name of Dun Edin, that is, the town of Edwin.

Even so early as the time of Edwin a town had probably grown up around the castle. But Edinburgh did not become the capital of Scotland till many centuries afterwards. All the space between the Forth and Northumberland was long accounted border or debateable territory, and was in the possession of Scotland and England alternately. In the twelfth century we find Malcolm IV., although he often resided in the castle of Edinburgh, still designating Scone as the metropolis of his kingdom. James II. was the first king who made it his usual residence, and the chief seat of his court,—the atrocious murder of his father at Perth, in 1437, having apparently determined him to remove to a more secure part of the kingdom.

Before the invention of artillery Edinburgh Castle was almost impregnable by force, when held by an adequate garrison; but it was nevertheless frequently taken by surprise. One of the most remarkable instances occurred in 1341. when William Douglas contrived by the following stratagem to recover it from Edward III. of England, for whom it was held by a garrison of great strength. "Douglas," says Grose, in his Antiquities, "with three other gentlemen, waited on the Governor. One of them, pretending to be an English merchant, informed him he had for sale, on board a vessel then just arrived in the Forth, a cargo of wine, strong beer, and biscuit exquisitely spiced; at the same time producing as a sample a bottle of wine and another of beer. The Governor, tasting and approving of them, agreed for the purchase of the whole, which the feigned captain requested he might deliver very early the next morning, in order to avoid interruption from the Scots. He came accordingly at the time appointed, attended by a dozen armed followers disguised in the habit of sailors; and the gates being opened for their reception, they contrived just in the entrance to overturn a carriage, in which the provisions were supposed to be loaded, thereby preventing them from being suddenly shut. They then killed the porter and sentries; and blowing a horn as a signal, Douglas, who with a band of armed men had lain concealed near the castle, rushed in and joined their companions. A sharp conflict ensued, in which most of the garrison being slain, the castle was recovered for the Scots, who about the same time had also driven the English entirely out of Scotland."

Among the subsequent sieges which it sustained, one of the most memorable was that which terminated on the 29th of May, 1573, when it was, after an obstinate defence of thirty-three days, surrendered to an English army by Kirkaldy of Grange, who held it for Queen Mary. Kirkaldy, who was one of the ablest and bravest men of that age, was basely hanged on this occasion, as well as his brother and other gentlemen, by the English commander, Sir William Drury, in violation of the articles of capitulation. There is a curious old Scottish poem, giving an account of this siege. In 1650, the castle again held out for two months against the forces of Cromwell, after the battle of Dunbar. An account of this siege may be found in a 4to. pamphlet, published at London in 1651. After the Revolution, although the town of Edinburgh espoused the cause of King William, the castle was held by the Duke of Gordon for King James till the middle of June, 1689. Two very detailed and curious accounts of this protracted blockade have been printed. In 1715 an unsuccessful attempt was made to surprise the castle by the rebels, a party of whom had almost reached the top of the rock by means of scaling-ladders before they were discovered. In the rebellion of 1745, although the town was for some time in the possession of the Pretender's forces, no assault was made upon the castle, which even preserved its communication with the town uninterrupted all the while.

Of the buildings forming the castle, the principal part consists of an oblong quadrangle, called the Grand Parade, the apartments on the east side of which are said to have been those formerly inhabited by the royal family. The principal apartment which is now visited by strangers is that in which are placed the ancient Scottish regalia, since their discovery in 1818, in an old chest in which they had been deposited immediately after the Union in 1707. This discovery excited at the time an extraordinary sensation in Scotland, where it was generally believed that the interesting relics in question had long been removed from the scrupulously-guarded, but never

till then unlocked, receptacle, to which they were said to have been so many years before consigned. The chest was broken open under authority of a warrant from the King; and the regalia, consisting of the crown, the sword of state, and two sceptres, were found with some pieces of linen loosely thrown over them, exactly in the state in which they were described to be in the document drawn up at the time when they were deposited. A full account of the whole affair, and also of the previous history of the regalia, which is not without several romantic passages, may be found in one of the volumes printed by the Bannatyne Club, entitled 'Papers relative to the Regalia of Scotland,' 4to., 1829. It is edited by Mr. William Bell

MONCONTOUR AND IVRY.

The struggle between the ancient faith and the Reformation, which in England was decided at the cost of the blood of only a few hundred individual victims, gave rise in France to a long and sanguinary contest of arms. Beginning in 1562, in the reign of Charles IX., with the encounter called the Massacre of Vassi, in Champagne, where some hundreds of the Huguenots, or Protestants, were killed and wounded by a sudden assault of the followers of the Duke of Guise, the strife did not terminate till the entry into Paris of Henry IV. in 1593. During the whole of this interval the kingdom was kept in a state of distraction by the alternations of this civil war, which, although it did not divide the population into two equal parts,—for the Catholics were, no doubt, always the immense majority,—yet drew so strong a support on both sides from different parts of the country, as to make it extremely difficult for either party to maintain a permanent superiority over the other.

Among the battles which marked the course of the contest, one of the most bloody was that fought on the 3d of October, 1569, at Moncontour, a village of Poictou (now comprehended in the department of Vienne), between the Huguenots commanded by the Admiral Coligni, and the Catholics led by the Duke of Anjou, who afterwards became King of France under the name of Henry III. The career of Coligni immediately previous had been a succession of disasters, the consequences of which, however, had been to a great extent averted by the admirable abilities of that general, of whom it has been said, that he was more to be feared after a defeat, than most others after a victory. Anjou was himself without any pretensions to superior military talent; but he enjoyed the advice and guidance of one of the ablest generals France ever produced, the Marshal de Tavannes, and by him the victories of the Duke were really gained. It was the skill of Tavannes which contrived at Moncontour to force Coligni into such a position as compelled him to fight. The young prince of Bearn, afterwards Henry IV., although only a boy of fifteen, was by the side of Coligni in this battle, having been shortly before committed to his charge as a pupil in the art of war, by his mother the Queen of Navarre. The battle was a very short one, but terminated in another complete defeat of the Huguenots, of whom not fewer than from ten to twelve thousand were left dead on the field. But, as on former occasions, partly by his own conduct and partly through the negligence and mismanagement of the enemy, Coligni speedily succeeded in more than repairing even this dreadful loss; and in less than a year he had so retrieved his fortunes as to have made himself master of a third part of the realm of France.

We have glanced at these remarkable events, principally to introduce two very spirited poems, which appeared some years ago in the 'Quarterly Magazine,' under the title of 'Songs of the Huguenots.' The subject of the first poem is Moncontour. The second is descriptive of the battle of Ivry, fought in 1590, where Henry IV. obtained the victory over the Duke of Mayenne, to which he principally owed the eventual submission of his enemies and his unopposed admission to the throne of his ancestors. As the one composition is a wail of lamentation and despair, in which the beaten and scattered Huguenots are supposed to pour out their grief over their fallen comrades, and their apparently ruined cause; so the other is their song of joy and triumph when their fortunes have changed, and their enemics had been scattered.

I. Moncontour.

Oh! weep for Moncontour. Oh! weep for the hour
When the children of darkness and evil had power;
When the horsemen of Valois triumphantly trod
On the bosoms that bled for their rights and their God.

Oh! weep for Moncontour. Oh! weep for the slain
Who for faith and for freedom lay slaughtered in vain.
Oh! weep for the living, who linger to bear
The renegade's shame, or the exile's despair.

One look, one last look, to the cots and the towers,
To the rows of our vines, and the beds of our flowers,
To the church where the bones of our fathers decayed,
Where we fondly had deemed that our own should be laid

Alas! we must leave thee, dear desolate home,
To the spearmen of Uri, the shavelings of Rome,
To the serpent of Florence, the vulture of Spain,
To the pride of Anjou, and the guile of Lorraine.

Farewell to thy fountains, farewell to thy shades,
To the song of thy youths, and the dance of thy maids,
To the breath of thy gardens, the hum of thy bees,
And the long waving line of the blue Pyrenees.

Farewell, and for ever. The priest and the slave
May rule in the halls of the free and the brave;—
Our hearths we abandon;—our lands we resign;—
But, Father, we kneel to no altar but thine.

II. Ivry.

Now glory to the Lord of Hosts, from whom all glories are!
And glory to our Sovereign Liege, King Henry of Navarre!
Now let there be the merry sound of music and of dance,
Through thy corn-fields green, and sunny vines, Oh pleasant land of France!
And thou Rochelle, our own Rochelle, proud city of the waters,
Again let rapture light the eyes of all thy mourning daughters.
As thou wert constant in our ills, be joyous in our joy,
For cold, and stiff, and still are they who wrought thy walls annoy.
Hurrah! Hurrah! a single field hath turned the chance of war,
Hurrah! Hurrah! for Ivry, and Henry of Navarre.

Oh! how our hearts were beating, when, at the dawn of day,
We saw the army of the League drawn out in long array;
With all its priest-led citizens, and all its rebel peers,
And Appenzel's stout infantry, and Egmont's Flemish spears.
There rode the brood of false Lorraine, the curses of our land;
And dark Mayenne was in the midst, a truncheon in his hand:
And, as we looked on them, we thought of Seine's empurpled flood,
And good Coligni's hoary hair all dabbled with his blood;
And we cried unto the living God, who rules the fate of war,
To fight for his own holy name, and Henry of Navarre.

The King is come to marshal us, in all his armour drest,
And he has bound a snow-white plume upon his gallant crest.
He looked upon his people, and a tear was in his eye;
He looked upon the traitors, and his glance was stern and high.
Right graciously he smiled on us, as rolled from wing to wing,
Down all our line, a deafening shout, "God save our Lord the King."
"And if my standard-bearer fall, as fall full well he may,
"For never saw I promise yet of such a bloody fray,
"Press where ye see my white plume shine, amidst the ranks of war,
"And be your oriflamme to-day the helmet of Navarre."

Hurrah! the foes are moving. Hark to the mingled din,
Of fife, and steed, and trump, and drum, and roaring culverin.
The fiery Duke is pricking fast across Saint André's plain,
With all the hireling chivalry of Guelders and Almayne.
Now by the lips of those ye love, fair gentlemen of France,
Charge for the golden lilies,—upon them with the lance.
A thousand spurs are striking deep, a thousand spears in rest,
A thousand knights are pressing close behind the snow-white crest;
And in they burst, and on they rushed, while like a guiding star,
Amidst the thickest carnage blazed the helmet of Navarre.

Now, God be praised, the day is ours. Mayenne hath turned his rein.
D'Aumale hath cried for quarter. The Flemish count is slain.
Their ranks are breaking like thin clouds before a Biscay gale;
The field is heaped with bleeding steeds, and flags, and cloven mail.
And then we thought on vengeance, and, all along our van,
"Remember Saint Bartholomew," was passed from man to man.
But out spake gentle Henry, "No Frenchman is my foe:
"Down, down, with every foreigner, but let your brethren go."
Oh! was there ever such a knight, in friendship or in war,
As our Sovereign Lord, King Henry, the Soldier of Navarre!

Ho! maidens of Vienna; Ho! matrons of Lucerne;
Weep, weep and rend your hair for those who never shall return.
Ho! Philip, send, for charity, thy Mexican pistoles,
That Antwerp monks may sing a mass for thy poor spearmen's souls.
Ho! gallant nobles of the League, look that your arms be bright;
Ho! burghers of Saint Genevieve, keep watch and ward to-night.
For our God hath crushed the tyrant, our God hath raised the slave,
And mocked the counsel of the wise, and the valour of the brave.
Then glory to his holy name, from whom all glories are;
And glory to our Sovereign Lord, King Henry of Navarre.

THE REIN-DEER.



[Milking of the Rein-Deer.]

The Rein-Deer, an animal of the most important service in the districts of which it is a native, is found nowhere but within the polar regions. Several attempts have been made to introduce it both into this country and into Scotland, but they all failed; and it is a remarkable fact, that those which were turned out into what were considered favourable situations, as for instance, on the Pentland Hills near Edinburgh, where they had a cold climate, and a sufficient supply of the rein-deer moss, which forms the principal part of their food, suffered more and died sooner than such as have been confined to a small enclosure, or even to a room, as in some of the Menageries and in the Zoological Gardens.

From the earliest times the rein-deer appears to have been domesticated by the Laplanders; and that dreary region owes to this animal whatever it possesses of civilization, and whatever comforts tend to render it supportable to the inhabitants.

The Laplanders are divided into two very distinct classes; one who are settled in their habits, living on or near the coast, and supporting themselves by fishing; the other inhabiting the mountains, and wandering through the summer and winter with no shelter but their tents, and no provision but their rein-deer. These valuable animals, however, are subject to a visitation in the summer which compels their owners to repair to the coast, frequently an arduous journey, in order to mitigate their sufferings and preserve their lives. M. De Broke, in his Travels in Lapland, thus describes these migrations:—

"Whale Island, during the summer months, is never without three or four families of mountain Laplanders (Field-finner), with their herds of rein-deer. The causes that induce, nay, even compel these people to undertake their long and annual migrations from the interior parts of Lapland to its coast, though they may appear singular, are sufficiently powerful. It is well known, from the account of those travellers who have visited Lapland during the summer months, that the interior parts of it, particularly its boundless forests, are so infested by various species of gnats and other insects, that no animal can escape their incessant persecutions. Large fires are kindled, in the smoke of which the cattle hold their heads, to escape the attack of their enemies; and even the natives themselves are compelled to smear their faces with tar, as the only certain protection against their stings. No creature, however, suffers more than the rein-deer from the larger species (œstrus tarandi), as it not only torments it incessantly by its sting, but even deposits its egg in the wound it makes in its hide. The poor animal is thus tormented to such a degree, that the Lap-

lander, if he were to remain in the forests during the months of June, July, and August, would run the risk of losing the greater part of his herd, either by actual sickness, or from the deer fleeing of their own accord to mountainous situations to escape the gad-fly. From these causes the Laplander is driven from the forests to the mountains that overhang the Norway and Lapland coasts, the elevated situations of which, and the cool breezes from the ocean, are unfavourable to the existence of these troublesome insects, which, though found on the coast, are in far less considerable numbers there, and do not quit the valleys; so that the deer, by ascending the highlands, can avoid them."

Early in September the herds and their owners leave the coast, in order to reach their winter quarters before the fall of the snows. With the approach of winter, the coat of the rein-deer begins to thicken, and like that of most other polar quadrupeds to assume a lighter colour. It is, however, when the winter is fairly set in that the peculiar value of the rein-deer is felt by the Laplanders. Without him, communication would be almost utterly suspended. Harnessed to a sledge, the rein-deer will draw about 300 lbs.; but the Laplanders generally limit the burthen to 240 lbs. The trot of the rein-deer is about ten miles an hour; and the animal's power of endurance is such, that journeys of one hundred and fifty miles in nineteen hours are not uncommon. There is a portrait of a rein-deer in the palace of Drotningholm (Sweden), which is represented, upon an occasion of emergency, to have drawn an officer with important despatches the incredible distance of eight hundred English miles in forty-eight hours. This event is stated to have happened in 1699, and the tradition adds, that the deer dropped down lifeless upon his arrival.

During the winter, the food of the rein-deer is the lichen or moss, which they display wonderful quickness of smell in discovering beneath the snow. In the summer they pasture upon all green herbage, and browse upon the shrubs which they find in their march. They also, it is now well ascertained, eat with avidity the lemming or mountain rat, affording one of the few instances of a ruminating animal being in the slightest degree carnivorous.

Of course, in a country where their services are so indispensable, rein-deer constitute the principal wealth of the inhabitants. M. De Broke says,—"The number of deer belonging to a herd is from three hundred to five hundred; with these a Laplander can do well, and live in tolerable comfort. He can make in summer a sufficient quantity of cheese for the year's consumption; and, during the winter season, can afford to kill deer enough to supply him and his family pretty constantly with venison. With two hundred deer, a man, if his family be but small, can manage to get on. If he have but one hundred, his subsistence is very precarious, and he cannot rely entirely upon them for support. Should he have but fifty, he is no longer independent, or able to keep a separate establishment, but generally joins his small herd with that of some richer Laplander, being then considered more in the light of a menial, undertaking the laborious office of attending upon and watching the herd, bringing them home to be milked, and other similar offices, in return for the subsistence afforded him."

Von Buch, a celebrated traveller, has well described the evening milking-time, of which a representation is given in the wood cut:—"It is a new and a pleasing spectacle, to see in the evening the herd assembled round the gamme (encampment) to be milked. On all the hills around, every thing is in an instant full of life and motion. The busy dogs are every where barking, and bringing the mass nearer and nearer, and the rein-deer bound and run, stand still, and bound again, in an indescribable variety of movements. When the feeding animal, frightened by the dog, raises his head, and displays aloft his large and proud antlers, what a beautiful and majestic sight! And when he courses over the ground, how fleet and light are his speed and carriage! We never hear the foot on the earth, and nothing but the incessant crackling of his knee-joints, as if produced by a repetition of electric sparks—a singular noise; and from the number of rein-deer, by whom it is at once produced, it is heard at a great distance. When all the herd, consisting of three or four hundred, at last reach the gamme, they stand still, or repose themselves, or frisk about in confidence, play with their antlers against each other, or in groups surround a patch of moss browsing. When the maidens run about with their milk-vessels from deer to deer, the brother or servant throws a bark halter round the antlers of the animal which they point out to him, and draws it towards them; the animal generally struggles, and is unwilling to follow the halter, and the maiden laughs at and enjoys the labour it occasions, and sometimes wantonly allows it to get loose that it may again be caught for her; while the father and mother are heard scolding them for their frolicksome behaviour, which has often the effect of scaring the whole flock. Who, viewing this scene, would not think on Laban, on Leah, Rachel, and Jacob? When the herd at last stretches itself, to the number of so many hundreds at once, round about the gamme, we imagine we are beholding an entire encampment, and the commanding mind which presides over the whole, stationed in the middle."

The wild rein-deer are hunted by the Laplanders, and also by the Eskimaux, and the Indians of North America.

ON THE HISTORY OF SMALL-POX.

Of the numerous diseases to which mankind are exposed, the class denominated epidemic or spreading diseases is attended with the most alarming interest. A malady of this sort may take its origin in the remotest district of an extensive country, and yet, if its progress be independent of the peculiarities of soil and climate, it may soon come to overrun the whole. In the same way, although a spreading malady commence in one hemisphere of the globe, it may after a time invade the other, and its ravages know ultimately no bounds, save those of human intercourse and human existence.

Those spreading diseases, from the great havoc they often commit, have been commonly known by the name of "plagues" and "pestilences." The word *plague* is apt to convey to an unprofessional person a very indefinite idea of some great calamity which he is unable to describe; but in reality it is neither more nor less than a *fever*. All plagues, in medical language, are understood to have been fevers; and they are distinguished one from the other by their *types* or peculiar character of their symptoms. Thus, the Egyptian plague is a fever which bears a strong resemblance to ordinary typhus, in producing an extreme depression of the constitutional powers of the patient; and it is distinguished from typhus by being attended with swellings of the glands in different parts of the body. The plague of London, which, in 1665, destroyed within the bills of mortality eight thousand persons in one week, was similar to that of Egypt. Varieties of the same virulent epidemic are probably pointed at in the writings of Thucydides and Galen as having prevailed in the earlier ages at Athens and at Rome. At all events it seems certain that during nearly one half of the sixth century, and at several periods since, large portions of Europe and of Asia were devastated by the Egyptian scourge.

Small-pox is a plague which, previous to the practice of vaccination, exercised a still more destructive power even than the preceding disease; but it does not appear that the physicians of ancient Greece or Rome were at all acquainted with small-pox. For the traces of its early

progress we must look farther east. In the traditions of the people of China and Hindostan small-pox was enumerated as one of their common diseases; and in some of their earliest books, devoted to religion and philosophy, descriptions of it have been found to exist.

China or Hindostan, then, must be considered the cradle of small-pox. We have no means, however, of ascertaining in which of the two it first appeared, or of offering a rational conjecture to explain the manner of its first production, beyond the fact that these countries have from remote ages swarmed with inhabitants, and been subject to dreadful inroads of famine—circumstances of themselves eminently favourable to the generation of pestilence. According to the Chinese and Brahminical authorities, there is written evidence to show that small-pox had been established in their respective countries during a period of three thousand years and upwards.

Although small-pox had prevailed so long in China and Hindostan, the first notice of its appearance in Western Asia cannot be dated earlier than the middle of the sixth century, and Europe was not invaded until a later period. The epoch to which we allude, as the recorded commencement of its western ravages, was the year 569, when the city of Mecca, in Arabia, was besieged by an army of Abyssinian Christians, under the command of Abreha, with the expectation of being able to destroy the Kaaba or Pagan temple contained within that city. In this army the small-pox committed dreadful havock, and we are also told that measles made its appearance there at the same time.

From the siege of Mecca, A.D. 569, to the siege of Alexandria, in 639, not any of the Arabian records that have come down to us make mention of the progress of small-pox. During this interval, however, the disease was undoubtedly propagated, in various directions, in the wake of the victorious Arabs, who were assembled and led forth to war under the banner of their prophet. War has been ever the ready disseminator of pestilence; and, as Persia and Syria were soon afterwards subdued by the successors of Mohammed, we may fairly conclude that small-pox was imported with the conquerors into these countries, if it had not previously reached them.

On the other hand, Amrou, the lieutenant of the Caliph Omar, invaded Egypt in 638. In two years he captured Alexandria. It is conjectured that small-pox was communicated by the Mohammedan troops to the inhabitants of this city during the siege. Ahron, an author who lived in Alexandria at the time, wrote a treatise on small-pox, to which Rhazes, the distinguished Arabian physician, alludes. Unfortunately, Ahron's work has been since lost.

The rapid and prolonged success which now attended the Saracens by land and sea, opened new channels for the diffusion of small-pox; and, in attempting to follow its progress westward, along the shores of the Mediterranean, we have no more certain guide than the chronological details of Saracenic conquest. Okba Ebn Nafe, the general of Amru, subdued that portion of Africa lying between Barka and Zoweilah, including what now constitutes the piratical state of Tripoli. To him succeeded others who pushed the dominion of the Saracens still further. In 712 their armies made a descent on Spain. After defeating Roderick, the last king of the Goths, they took Toledo, and eventually overrun the whole country. About the year 732 the Saracens crossed the Pyrenees. Consequently with the period of this invasion we may date the introduction of small-pox into that kingdom.

Small-pox probably reached Britain about the beginning of the ninth century; but no distinct notice of this extraordinary visitor is furnished by the writers of the time. Sunk in the ignorance of the middle ages, they allowed the worst scourge that had ever thinned the human race to pass without description; or, if mentioned at all in their meagre chronicles, it is only under the name of "plague," or of "consuming fire,"—epithets then apparently applied to eruptive pestilences in common.

When small-pox enters a locality where it had not been before, its first effects are almost always more extensively destructive than any subsequent. Happily, in the present day, we can form, from our own experience, no conception of the mortality that in all probability marked its early course in England. A deadly pestilence, to one attack of which, as a general rule, every individual, in every rank of life, the highest as well as the lowest, is liable, must necessarily have filled the country from one extremity to the other with sickness and with death. To aggravate the occurrence of such an evil, no disease is in itself more loathsome than small-pox. The victim of the attack, more particularly in the confluent variety, presents a most pitiable spectacle. In this form the patient is seen labouring under a fever, with the worst typhoid or putrid symptoms. He is at the same time completely covered from head to heel with pustules, which not unfrequently coalesce, and ultimately change the whole surface of his body into one continued sore that renders his features undistinguishable to his dearest friends, and converts him into an object of disgust to their senses. Nor are the immediate sufferings and danger of death the only misfortunes attendant on small-pox. In case the patient linger through the fever, or finally survive the attack, it is often at the sacrifice of every thing considered desirable in personal appearance. Beauty may be transformed into deformity—and, what is of far greater importance, by the loss of sight the patient may be condemned to pass the remainder of his life in total darkness.

Countries which have received small-pox in comparatively modern times, afford striking examples of the magnitude of the calamity in its unmitigated terrors. In 1517 St. Domingo was infected. The island then contained, it is said, a million of Indians; but these unfortunate people were altogether destroyed by small-pox and the murderous arms of their Spanish invaders. About 1520 small-pox commenced in Cuba. From thence it was carried to Mexico. Within a short period, according to computations that have been made, the pestilence destroyed in the kingdom of Mexico alone three millions and a half of the inhabitants. The emperor, brother and successor to Montezuma, was among the victims. At subsequent periods different parts of the American continent suffered much. Whole nations of warlike Indians were almost extirpated; and piles of bones, found under the tufted trees in the interior of the country, have been supposed to bear testimony to the ravages of small-pox.

Peculiarities of climate exercise no mollifying influence over the virulence of small-pox. Iceland was invaded in the year 1707, and it suffered as much as the southern regions. The inroad destroyed sixteen thousand persons —more than a fourth of the estimated population of the island. Greenland escaped until 1733. In that year small-pox appeared, and carried off nearly all its inhabitants.

Small-pox is now familiar to every section of the globe; but we hear of it no longer as a scourge to sweep away the population of an extensive district, with a rapidity and power approaching to those of the tornado. The beneficent Providence which, for the fulfilment of its own mysterious purposes, tolerates the growth and extension of numerous plagues, has placed within the reach of human intelligence numerous remedies capable either of alleviating or of completely obviating their dangerous effects. Without the aid of inoculation and vaccination it is calculated that at least one fourteenth of every generation of mankind would perish beneath the deadly taint of small-pox; but that, were inoculation generally practised, the mortality would not amount to

one in seventy of those on whom the operation had been performed, and, under the protective influence of vaccination, that one death is not to be expected in many hundreds of persons so treated. Inoculation has of late years been wisely abandoned by the medical profession; vaccination is recommended in its stead. The history of the progress of inoculation, and of Dr. Jenner's invaluable discovery, we shall touch upon in a future number.

DANIEL DEFOE.

In the ensuing week occurs the anniversary of the death of this great writer, whose name is doubtless known to most of our readers as that of the author of Robinson Crusoe; but who, although more than a century has now elapsed since he ceased to live, has not yet obtained in the general estimation that share of fame and that rank in English literature to which he is justly entitled. Defoe's was a life of extraordinary activity; an account of which, therefore, if given in detail, might occupy, as indeed it has been made to occupy, volumes. Here we must confine ourselves to a very rapid and general sketch. He was born in 1661, in London, where his father was a butcher, of the parish of St. Giles's, Cripplegate. The family name was *Foe*, to which he appears to have himself prefixed the *De*. His father, who was a dissenter, sent him to be educated at an academy at Newington Green, kept by a clergyman of his own persuasion. Here he distinguished himself by his fondness for reading every thing that came in his way, and his industry in storing his mind with useful knowledge. On leaving the academy he is supposed to have been bound apprentice to a hosier; and he afterwards set up for himself in that line in Freeman's Yard, Cornhill. It is probable, however, that he had scarcely finished his apprenticeship when he made his first appearance as an author; for in one of his later writings he mentions a political pamphlet which he published in 1683, and in terms which almost seem to imply that even that was not the first production of his pen; he was then, he says, "but a young man, and a younger author."

Literature was destined to become Defoe's chief profession. His speculations in trade, among which was a brick and tile work near Tilbury Fort in Essex, were not fortunate; and about the year 1692 he became bankrupt. His conduct in relation to this event was highly to his honour; for, although he had obtained an acquittal from his creditors on giving up every thing he had, he appears to have persevered to the end of his life in the endeavour to pay off the full amount of his debts, and to have succeeded to a great extent in effecting that object. About a dozen years after his bankruptcy, he states in one of his publications, that "with a numerous family, and no helps but his own industry, he had forced his way with undiscouraged diligence through a sea of misfortunes, and reduced his debts, exclusive of composition, from seventeen thousand to less than five thousand pounds." He had married in 1687.

Although Defoe had come forth so early as a political writer, his next appearance from the press was in a different character. In 1697 he published a work bearing the title of 'An Essay on Projects.' It is full of new and ingenious schemes, connected not only with trade and commerce, but with education, literature, and the general interests of social improvement. This same year, however, we find him re-entered upon his old field of politics, where he continued to distinguish himself as the most active, the most able, and the most conspicuous, among a crowd of fellow-combatants, throughout a stormy period of about eighteen years. Our space will not permit us to follow him through the various incidents of this part of his history, or even to enumerate the productions of his fertile and unwearied pen. Subordinate and comparatively humble as was the sphere in which he moved, and exposed as he was from his circumstances to all sorts of temptations, Defoe's political career was distinguished by a consistency, a disinterestedness, and an independence, which have never been surpassed, and but rarely exemplified to the same degree by those occupying the highest stations in the direction of national affairs. His principles repeatedly drew upon him obloquy, danger, persecution, and punishment, both in the shape of personal and pecuniary suffering, and in that of stigma and degradation; but nothing ever scared him from their courageous avowal and maintenance. The injustice he met with on more than one occasion was not more shocking from its cruelty than from its absurdity.

It was on the 19th of February, 1704, during his imprisonment on a conviction for publishing a satirical pamphlet, entitled 'The Shortest Way with the Dissenters,' that he commenced his political paper, entitled, first, a 'Review of the Affairs of France,' and afterwards, (namely from 1st January, 1706,) a 'Review of the State of the English Nation.' It was originally published only once a week, but at last appeared every Tuesday, Thursday, and Saturday, printed on a half sheet, or four quarto pages. To the political news and disquisitions, was regularly appended a short chronicle of domestic incidents; and the whole was written by Defoe himself. The work was continued till the completion of the ninth volume in May, 1713; when a tax which had recently been imposed, the same which probably occasioned the dropping of the Spectator, (see Penny Magazine, vol. i. p. 147,) induced the author to bring it to a termination. He was then in Newgate for the second time. Defoe's Review, which, at its commencement at least, had very great success, has been usually regarded as the parent, and in some respects the model of the Spectator. But it has not enjoyed the good fortune of that celebrated work; for while the Spectator has been reprinted many times, a perfect copy of the Review, we believe, is not now known to exist. There are only the first six of the nine volumes in the Museum. But many other works proceeded from Defoe's pen while he was engaged with this publication. Among the most remarkable of these was his poem in twelve books, entitled 'Jure Divino,' an able attack on the notion of the divine right of kings,—and his History of the Union with Scotland, an event in the negotiating of which he had a considerable share, having been sent down by government to Edinburgh for that purpose. Defoe appears to have accounted his services on this occasion among the most important he had been able to render to his country; and probably few individuals of that day saw so clearly the advantages of the arrangement which thus converted the two nations into one people.

Conformably to the fate which had pursued him through life, the accession of the house of Hanover, although the end and consummation, it may be said, of all his political labours, instead of bringing him honours and rewards, consigned him only to neglect and poverty. The treatment he met with seems to have affected his health, though it could not break his spirit. In 1715 he was struck with apoplexy, and for some time it was apprehended that he would not recover from the attack. The strength of his constitution, however, which had been sustained by a life of unsullied correctness and temperance, carried him through. But he was now resolved to abandon politics, and to employ his pen for the future on less ungrateful themes. The extraordinary effect of this determination was to enable him, by a series of works which he began to produce after he had reached nearly the age of sixty, to eclipse all that he had formerly done, and to secure to himself a fame which has extended as far and will last as long as the language in which he wrote. Robinson Crusoe, the first of his admirable fictions, appeared in 1719. The reception of it, says Mr.

Chalmers, "was immediate and universal; and Taylor, who purchased the manuscript after every bookseller had refused it, is said to have gained a thousand pounds." It has ever since continued, as every reader knows, to be one of the most popular books in the English tongue, the delight alike of all ages, and enchaining the attention by a charm hardly possessed in the same degree by any similar work. Other productions in the same vein, and more or less ably executed, followed in rapid succession from the pen of the industrious and inexhaustible author. Among them are especially to be mentioned his Journal of the Plague, a fictitious narrative, published in 1722, which is said to have deceived Dr. Mead, and to have been taken by him for a true history; his Memoirs of a Cavalier, which appeared the same year; and his Life of Colonel Jack, published the year following. All these narratives, the mere fabrications of the writer's invention, are distinguished by an air of nature and truth, which it is almost impossible during the perusal not to take for genuine. Defoe died in his native parish on the 24th (not as has been often stated the 26th) of April, 1731, and consequently in his 70th or 71st year. He was buried in Bunhill Fields, then called Tindall's Burying-ground. He left several children, the descendants of some of whom still survive. It is lamentable to think that he appears after all his exertions to have died insolvent. The vast amount of his literary labours may in some degree be conceived from the fact, that the list of his publications given by Mr. Wilson, his latest biographer, contains no fewer than 210 articles, and it is believed not to be complete. Many of these works were written in circumstances of great privation and distress. In the preface to his poem of "Jure Divino," occurs the following affecting passage, with which we shall conclude our notice:—"I shall say but very little in the defence of the performance but this; it has been wrote under the heaviest weight of intolerable pressures; the greatest part of it was composed in prison; and as the author has unhappily felt the most violent and constant efforts of his enemies to destroy him ever since that, the little composure he has had must be his short excuse for any thing incorrect. Let any man, under millions of distracting cares, and the constant ill-treatment of the world, consider the power of such circumstances over both invention and expression, he will then allow that I had been to be excused, even in worse errors than are to be found in this book."



[Portrait of Defoe.]

INVENTION OF PAPER.

There is no country which has not had its learned and elaborate inquirers as to the means through which Europe became acquainted, sometime about the eleventh century, with the article of paper. Casiri, however, whilst employed in translating Arabic writers, has discovered the real place from which paper came. It has been known in China, where its constituent part is silk, from time immemorial. In the thirtieth year of the Hegira, (in the middle of the seventh century,) a manufactory of similar paper was established at Samarcand; and in 706, fifty-eight years afterwards, one Youzef Amrû, of Mecca, discovered the art of making it with cotton, an article more commonly used in Arabia than silk. This is clearly proved by the following passage from Muhamad Al Gazeli's 'De Arabicarum Antiquitatum Eruditione:'—"In the ninety-eighth year of the Hegira," says he, "a certain Joseph Amrû first of all invented paper in the city of Mecca, and taught the Arabs the use of it." And as an additional proof, that the Arabians, and not the Greeks of the lower empire, as it has long been affirmed, were the inventors of cotton paper, it may be observed that a Greek of great learning, whom Montfaucon mentions as having been employed in forming a catalogue of the old MSS. in the king's library at Paris, in the reign of Henry II., always calls the article '*Damascus Paper*.' The subsequent invention of paper, made from *hemp* or *flax*, has given rise to equal controversy. Maffei and Tiraboschi have claimed the honour in behalf of Italy, and Scaliger and Meermann, for Germany; but none of these writers adduce any instance of its use anterior to the fourteenth century. By far the oldest in France is a letter from Joinville to St. Louis, which was written a short time before the decease of that monarch in 1270. Examples of the use of modern paper in Spain, date from a century before that time; and it may be sufficient to quote, from the numerous instances cited by Don Gregorio Mayans, a treaty of peace concluded between Alfonso II. of Aragon, and Alfonso IX. of Castille, which is preserved in the archives at Barcelona, and bears date in the year 1178; to this we may add, the *fueros* (privileges) granted to Valencia by James the Conqueror, in 1251. The paper in question came from the Arabs, who, on their arrival in Spain, where both silk and cotton were equally rare, made it of hemp and flax. Their first manufactories were established at Xativa, the San Felipe of the present day; a town of high repute in ancient times, as Pliny and Strabo report, for its fabrication of cloth. Edrisi observes, when speaking of Xativa, "Excellent and incomparable paper is likewise made here." Valencia too, the plains of which produce an abundance of flax, possessed manufactories a short time afterwards; and Catalonia was not long in following the example. Indeed the two latter provinces at this moment furnish the best paper in Spain. The use of the article, made from flax, did not reach Castille until the reign of Alfonso X., in the middle of the thirteenth century, and thence it cannot be questioned that it spread to France, and afterwards to Italy, England, and Germany. The Arabic MSS., which are of much older date than the Spanish, were most of them written on satin paper, and embellished with a quantity of ornamental work, painted in such gay and resplendent colours, that the reader might behold his face reflected as if from a mirror.—*Journal of Education*, No. 10.

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RICHMOND CASTLE, YORKSHIRE.



[Richmond Castle, from the River Swale.]

THE origin of the town of Richmond, in the North Riding of Yorkshire, dates from a few years after the conquest. Earl Edwin, who, before that event, possessed the part of the country in which Richmond is situated, was perhaps the most powerful of the Saxon nobles—being, in addition to the extensive lands of which he was lord, nearly allied by blood to the royal family. It was not to be supposed that a person occupying such a position as his would yield any thing beyond a forced submission to the Norman invaders. We find the young and brave Earl, accordingly, at the head of two vigorous attempts successively made by those of his nation, to recover the independence of their country, within the first three years after the arrival of William. He was pardoned for his participation in the first; but on the second occasion, after the revolt had been suppressed, he was betrayed by some persons in whose fidelity he had confided, and notwithstanding a gallant defence, overpowered and slain. His assassins carried his head to William, in hopes of obtaining a reward for the deed; when the stern Norman is said to have shed tears at the sight, and, instead of bestowing upon them preferment or gold, to have commanded that the perpetrators of the crime should be banished from the kingdom. Before this, however, he had stripped the Saxon Earl of his broad domains, and transferred them to a follower and kinsman of his own, Alan, Count of Bretagne, to whom he also sometime after gave his daughter Hawise in marriage. By this gift it is said, that Count Alan was put in possession of no fewer than two hundred manors and townships. It was he who, to protect himself and his property from the hostile population, in the midst of whom he came to establish himself, built the Castle of Richmond, around which the town was probably soon formed by his Norman retainers.

After Alan's death, the earldom of Richmond descended to a son of Hawise by a former husband, she having left no children by the Count of Bretagne. After this the dignity was held successively by various families. It was at length erected into a dukedom by Henry VIII. in favour of his natural son by the daughter of Sir John Blount, who died in 1535 at the age of seventeen. The dukedom fell to the present family in the reign of Charles II., and with it the Castle of Richmond.

The castle has long been a complete ruin. Leland, who saw it in 1534, speaks of it in his Itinerary as even then fallen into decay and deserted. Yet it does not appear to have suffered from any siege, or other species of violence. Neglect alone would seem to have reduced it to its present condition. It certainly has not been inhabited at least since the year 1485, when it came into the possession of the crown, by the accession of Henry VII., who was previously Earl of Richmond.

The town and castle stand on elevated ground on the north bank of the river Swale. The site of the castle, which is between the river and the town, occupies a space of about six acres. Except on the north side, or that next the town, the fortress from the natural advantages of its position, must have been quite inaccessible. The ground on which it is built is elevated to the height of fully one hundred feet above the stream, the precipice being broken into two parts about midway down by a walk eight or nine feet broad, which runs under the castle wall. The portion of the hill above the walk is faced with large stones, so as to give it almost the appearance of a rock. On the west side of the castle is a deep valley, which is probably artificial; and

the Swale also winds round the east side, where the descent is much more gradual. On the north there was formerly a moat, which however has been long filled up and obliterated. The whole was originally surrounded by a high wall, strengthened at intervals with towers, and measuring not less than half a mile in extent.

For a long time after its erection Richmond Castle was probably unrivalled in England for either extent or strength. It was a military stronghold, constructed in every part with a view to defence. The old barons lived here in the condition of petty sovereigns, and kept the surrounding country in awe and subjection for many miles around from their impregnable fortress.

The principal portion of the edifice that now remains is an immense square tower on the north side, said to have been built about the middle of the twelfth century. It measures fifty-four feet in one direction, by forty-eight in another; and the walls are ninety-nine feet in height, and eleven in thickness. Above these pinnacles rise from the four corners. This tower has consisted originally of three stories, the lowest of which is supported by a massive stone pillar placed under the centre of its arched roof. The roofs of the two upper stories have fallen in; and a winding staircase, which formerly no doubt ascended to the top, now reaches only to the height of the middle apartment. There is a well of excellent water within this tower. At the south-east corner of the castle there is the ruin of a smaller tower, in the bottom of which is formed a dungeon about fourteen feet in depth. And there is another tower at the south-west corner, round and narrow, and of considerable height, to which there is no entrance except from the top. It was probably used as a prison.

Ruined and desolate as it is, the aspect of Richmond Castle is still singularly majestic and imposing. Its venerable antiquity, its vast extent, its commanding position, and the massiveness and lofty altitude of those parts of the structure which time has not yet overthrown, all contribute to fill the mind with a sense of sublimity in gazing upon its broken arches and ivy-mantled towers. The effect is powerfully aided by the character of the surrounding landscape, which, towards the north-west especially, has much of the grandeur of highland scenery.

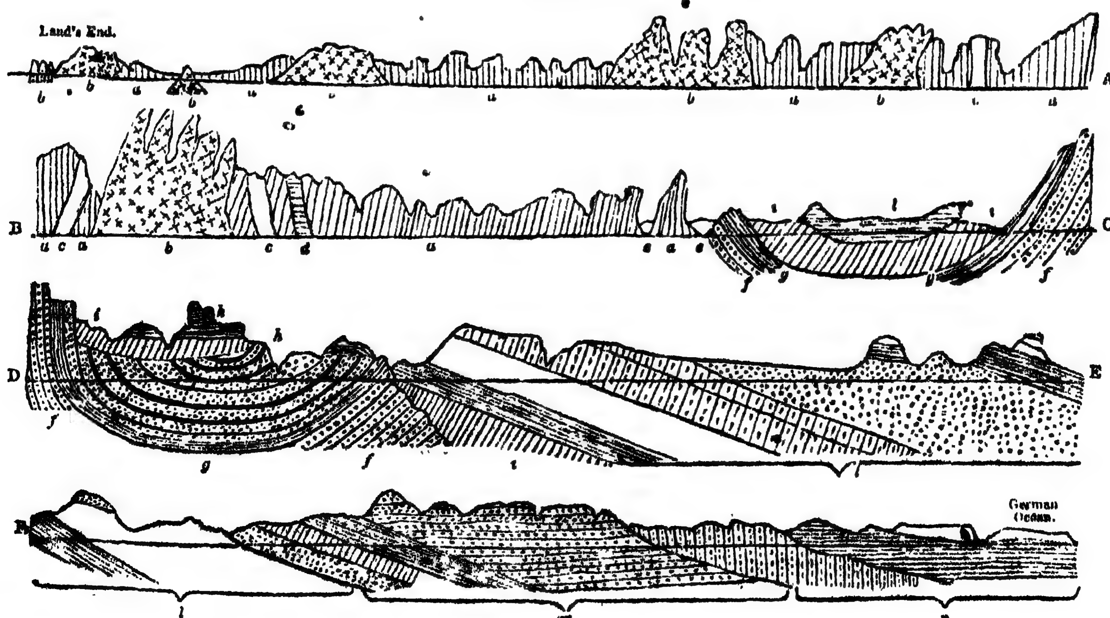
Viewed from the surrounding hills the town and castle of Richmond, notwithstanding their elevation above the ground in their immediate neighbourhood, seem to lie at the bottom of a valley. It is extremely probable that the place has derived its name, Richmont, or the Rich Mount, from its eminent natural attractions. Richmond in Surrey is said to have been so named in a much later age on the same account. The scenery around the latter celebrated spot, however, it has been remarked, differs essentially in character from that in the midst of which the Yorkshire Richmond is placed,—the beautiful being the prevailing ingredient in the one, while of the other landscape, a wild and stern grandeur may rather be said to be the predominant expression. With this, which is however intermingled and relieved in many places by the richest attractions of a softer kind, the old and frowning ruin, to which our notice relates, is admirably in keeping.

MINERAL KINGDOM.—Section 7.

In the sketch we have given of the Secondary and Tertiary Rocks, in speaking of the organic remains which they contain, we have done little more than mention the existence of certain classes, as they appear in the order of succession. But there are circumstances connected with these bodies so very important, as regards the history of our planet, that even a very brief outline of geology would be incomplete, were they left unnoticed. We shall endeavour, in a subsequent section, to lay before our readers some of the most remarkable results which the researches of geologists in this department have brought to light.

We gave, in our second section, a kind of tabular view of the order of succession in the stratified rocks, and having now completed our sketch of the different groups of strata, we shall exhibit, not an ideal, but a real, section of a part of England, which will at once convey, far more intelligibly than any verbal description, a very correct notion of the manner in which the strata now present themselves, when we penetrate the crust of the earth, or view them in those precipices on the sea-shore, or in mountainous districts, where natural sections are exposed.

(No. 6.)—Section of the stratified and unstratified Rocks from the Land's End in Cornwall to the Coast of Suffolk.



The reader will observe that the above four parts belong to one continuous line, which has been broken, in order to adapt it to the form of our page, but the index letters show where they unite:—A joins to B, C to D, and E to F. It is taken from the excellent work of Coneybeare and Phillips on the Geology of England

and Wales, and those who have access to that book will perhaps understand the section better, as it is there given, the colours and names rendering it more clear. There are also other instructive sections in the same plate. It must not be supposed that any such section as that represented here is to be seen: it is constructed by putting together an extensive series of exact observations and measurements at detached points along the line, made, however, with such care, that if the land were actually cut down, it is very unlikely that any of the great features would be found to be erroneous. Suppose then that a line be drawn from the Land's End to Bendley Hill, on the east coast, near Harwich, not absolutely straight, but passing over all the great features of the country that lie between the two points, at a short distance on either side of an imaginary central line; and that a vertical section were made, to a depth in some place, as far below the level of the sea, as we have penetrated in our deepest mines—the precipice thus exposed would present such an arrangement of the strata as is exhibited in the above diagram. It is necessary, however, to state that neither the horizontal distances nor the vertical elevations can be given in such a diagram in their true proportions. To do so, the paper must have been many yards long, and several feet in height. The order of position, and the succession of the strata as they lie over each other, are, however, truly given; and nothing would be gained for the illustration of the facts the section is intended to represent, by increasing either the length or height. The horizontal line represents the level of the sea. We shall now travel along the line of section, beginning our journey at the Land's End in Cornwall. We shall thus, as we move eastward, meet the different groups of strata in the order of succession we have already described, and shall find the tertiary rocks on the shores of the German ocean.

Fig. A is that portion of the section which extends from the Land's End to the western slope of Dartmoor Forest, north of Tavistock,—crossing Mount's Bay to Marazion, Redruth, Truro, and north of Grampound and Lostwithiel. The principal rock is primary slate, *a*, which is in highly inclined strata, and is traversed by numerous metallic veins and great veins or dykes of granite and other unstratified rocks, *b* and *c*, the granite also forming great mountain masses that rise in some instances to the height of 1368 feet above the sea, and in many places the great masses of granite are seen to send up shoots in numerous and frequently slender ramifications into the superincumbent slate.

Fig. B C contains that part of the section which lies between a point some miles north of Tavistock, and the summit of the Mendip Hills in Somersetshire, passing near Tiverton, Milverton, Nether Stowey, and Cheddar. On the left or western part, we find a continuation of the slaty rocks, *a*, traversed by veins of whinstone, *c*, and then we come upon a mass of granite, *b*, forming the lofty mountain group of Dartmoor Forest. This is flanked on the east by the same slate that occurs on the west, and containing veins of whinstone, *c*, and subordinate beds of limestone, *d*. The slate continues without interruption for many miles, as far east as the Quantock Hills, near Nether Stowey, where it is seen for the last time on this line of section, being succeeded by the secondary rocks. A great part of the slate belongs to that lowest group of the secondary rocks called transition, in which the rock *Grauwacke* prevails, from which the group has been named. On each side of the Quantock Hills are deposits of rounded pebbles of grauwacke and limestone cemented together, *e a*. To the slate, *a*, succeeds the old red sandstone group, *f*, followed by the mountain limestone group, *g*. The strata of these rocks soon after their deposition, must have been violently acted upon, for they are thrown up in such a manner as to form a trough or basin, as it is called in geological language, and in this trough there are found the red marl group, *i*, and the lowest member of the oolite group, the lias limestone, *l*. Here we miss a member of the series which should have come between the mountain limestone and the red marl, viz. the coal group—this is a blank of very frequent occurrence, but we shall find it in its right place on the other side of the Mendip Hills. These are cut through on the right of the figure, and are seen to be composed of old red sandstone in the centre, covered on their sides by mountain limestone.

Fig. D E represents that part of the section which lies between the Mendip Hills and Shotover Hill near Oxford. On the west we see the old red sandstone group in the centre of the Mendip ridge, and that it is succeeded by a very instructive section of the great coal-field of Somersetshire. Here, as on the west side of the Mendip Hills, the old red sandstone and mountain limestone groups have been acted upon by such a force from below, that they have been thrown up in opposite directions, and have formed a trough. As the coal measures, *h*, partake of the curvature, it is evident that the disturbance took place subsequently to their deposition, but it must have been prior to that of the next group, for the red marl beds, *i*, are deposited in unconformable stratification upon the turned-up ends of the strata of the coal group. The red marl group is covered by the portions of the lowest bed of the oolite group, *k*, indicating some powerful action at the surface, which has caused the removal of the connecting portions of the oolite beds, leaving insulated masses on the summits of high hills. This last occurrence of a mass of an horizontal stratum capping a lofty hill is very frequent, for the surface of the earth exhibits many proofs of its having been acted upon by water in motion, which has scooped out valleys and washed away vast tracts of solid earth. But such mountain caps have been also sometimes produced by the elevation of the mountain, a portion of rock being carried up to a great elevation, which had been a part of an extensively continuous stratum at a lower level. This deposit of the coal group is succeeded as we proceed eastward by the red marl group, resting in unconformable stratification on the ends of the old red sandstone, two intermediate groups being thus wanting, and this is followed for many miles by successive members of the oolite group, *l*, inclined at a low angle.

Fig. F. The oolite group continues from Shotover Hill to the neighbourhood of Aylesbury, where it is succeeded by the sands, clays, and marls, which form the inferior members of the chalk group, *m*. Near Tring the chalk with flints emerges, forming the lofty hill of Ivinghoe, which is 904 feet above the level of the sea, and it continues uninterruptedly to Dunmow in Essex. Here the secondary rocks terminate, and the chalk is covered by very thick beds of clay, *n*, which form the lowest members of the tertiary strata, and continuing on to the sea, appear in the cliffs of the coasts of Essex and Suffolk.

In the greater part of the country through which the above section has been carried, it will be seen that no unstratified rocks rise to the surface after we leave the district of Dartmoor Forest. That they exist below the strata, and that their protrusion *towards* the surface has been the cause of the disturbance of the sedimentary deposits exhibited by this section, is at least extremely probable, for we find them coming to the surface from under several of these strata in other parts of Great Britain.

In the diagram No. 1, representing the general order of succession of the stratified rocks, we have selected examples of their occurrence from our own territory, in order to give our readers an opportunity of examining the rocks when they happen to be near the spots mentioned, and to show that our island affords almost an epitome of the mineral structure of the crust

of the globe. There are some rocks of great extent found on the Continent which have not yet been observed in Great Britain, but they are only subordinate members of one of the groups we have mentioned. With the exception of these, some of the superior members of the tertiary series, and the products of active volcanoes, Great Britain and Ireland afford an ample field for studying almost every thing that is most important in the science of geology.

THE ORANG-OUTANG.



[The Orang-Outang. From a Sketch of a live Specimen.]

Of the animals commonly called four-footed, or quadrupeds, there is a family or genus comprehending upwards of a hundred different species, to which, upon a more accurate examination of the structure of their extremities, the popular designation appears to be incorrectly applied. The anterior extremities of monkeys are furnished, as is well known, with fingers, and a thumb capable of being opposed to these fingers, the whole bearing a striking resemblance to the human hand; and the same structure is observed in a tribe of animals nearly allied in external character to monkeys, called lemurs. Not only are their anterior extremities thus distinguished; but we find also, on examining their hinder extremities, that instead of having a great toe placed parallel with the others, they are furnished with a real thumb, that is, a part capable of being opposed to the other toes. Hence the parts corresponding to the hind-feet of other animals are, more properly speaking, hands; and the whole family of animals distinguished by this structure has been called by naturalists *quadrumanous*, or four-handed.

Of the whole tribe of quadrumanous animals, the orang-outang is that which approaches most nearly in structure and organization to the human subject. The above is a portrait of an individual exhibited about two years ago*.

In the year 1817 an orang-outang was brought to this country from Java by Dr. Abel, to whom we are indebted for a more scientific and instructive, as well as interesting and entertaining account of the structure and habits of this animal than is to be found in the writings of any other traveller or naturalist. This animal survived his transportation to this country from August, 1817, when he arrived, to the 1st of April, 1819, during which interval he was in the custody of Mr. Cross at Exeter 'Change, as much caressed for the gentleness of his disposition, as esteemed by scientific visitors of Mr. Cross's Menagerie for his great rarity.

It may be necessary, says Dr. Abel †, to acquaint some of my readers that the orang-outang of Borneo has been confounded by many writers with an animal that inhabits Africa, and which has also been called orang-outang, but is more correctly known by the name of Pongo. The pongo, which has been minutely described by Tyson,

* The orang-outang in this cut is represented as washing his hands. The attitude is taken from a description given in a singular book, entitled 'The Adventures of a Younger Son.'

† Narrative of a Journey in the interior of China, &c. p. 319.

differs anatomically from the subject of this description, and in having large ears and black hair.

Orang-outang is a Malay phrase, signifying "wild man," and should therefore be restricted to the animal which, according to our present information, is found exclusively on Borneo.

The height of the animal, judging from his length when laid on a flat surface and measured from his heel to the crown of his head, is two feet seven inches.

The hair of the orang-outang is of a brownish red colour, and covers his back, arms, legs, and outside of his hands and feet. On the back it is in some places six inches long, and on his arms five. It is thinly scattered over the back of his hands and feet, and is very short. It is directed downwards on the back, upper arm, and legs, and upwards on the fore-arm. It is directed from behind forwards on the head, and inwards on the inside of the thighs. The face has no hair, except on its sides, somewhat in the manner of whiskers, and a very thin beard. The middle of the breast and belly was naked on his arrival in England, but has since become hairy. The shoulders, elbows, and knees have fewer hairs than other parts of the arms and legs. The palms of the hands and feet are quite naked.

The prevailing colour of the animal's skin, when naked or seen through the hair, is a bluish grey. The eyelids and margin of the mouth are of a light copper-colour. The inside of his hands and feet are of a deep copper-colour. Two copper-coloured stripes pass from the arm-pits down each side of the body as low as the navel.

The head, viewed in front, is pear-shaped, expanding from the chin upwards, the cranium being much the larger end. The eyes are close together, of an oval form, and dark brown colour. The eyelids are fringed with lashes, and the lower ones are saccular and wrinkled. The nose is confluent with the face, except at the nostrils, which are but little elevated; their openings are narrow and oblique. The mouth is very projecting, and of a roundish mammillary form. Its opening is large, but when closed is marked by little more than a narrow seam. The lips are very narrow, and scarcely perceptible when the mouth is shut. The chin projects less than the mouth; below it a pendulous membrane gives the appearance of a double chin, and swells out when the animal is angry or much pleased. Each of the jaws contains twelve teeth, namely, four incisive teeth, the two middle ones of the upper jaw being twice the width of the lateral, two canine and six double teeth. The ears are small, closely resembling the human ear, and have their lower margins in the same line with the external angles of the eyes.

The chest is wide when compared to the pelvis; the belly is very protuberant. The arms are long in proportion to the height of the animal, their span measuring full four feet seven inches and a half. The legs are short when compared with the arms.

The hands are long when compared with their width and with the human hand; the fingers are small and tapering; the thumb is very short, scarcely reaching the first joint of the fore-finger. All the fingers have very perfect nails of a blackish colour and oval form, and exactly terminating with the extremities of the fingers. The feet are long, resemble hands in the palms and in having fingers rather than toes, but have heels resembling the human. The great toes are very short, are set on at right angles to the feet close to the heel, and are entirely without nails.

The orang-outang of Borneo is utterly incapable of walking in a perfectly erect posture. He betrays this in his whole exterior conformation, and never wilfully attempts to counteract this tendency. His head leaning forwards, and forming a considerable angle with the back, throws the centre of gravity so far beyond the perpendicular, that his arms, like the fore-legs of other animals, are required to support the body. So difficult, indeed, is it for him to keep the upright position for a few seconds, under the direction of his keeper, that he is obliged, in the performance of his task, to raise his arms above his head and throw them behind him to keep his balance. His progressive motion on a flat surface is accomplished by placing his bent fists upon the ground, and drawing his body between his arms; moving in this manner he strongly resembles a person decrepit in the legs supported on stilts. In a state of nature he probably seldom moves along the ground, his whole external configuration showing his fitness for climbing trees and clinging to their branches. The length and pliability of his fingers and toes enable him to grasp with facility and steadiness, and the force of his muscles empowers him to support his body for a great length of time by one hand or foot. He can thus pass from one fixed object to another at the distance of a span from each other, and can obviously pass from one branch of a tree to another through a much greater interval. In sitting on a flat surface, this animal turns his legs under him. In sitting on the branch of a tree or on a rope he rests on his heels, his body leaning forward against his thighs. This animal uses his hands like others of the monkey tribe.

The orang-outang, on his arrival in Java, was allowed to be entirely at liberty till within a day or two of being put on board the Cæsar to be conveyed to England, and whilst at large made no attempt to escape, but became violent when put into a large railed bamboo cage, for the purpose of being conveyed from the island. As soon as he felt himself in confinement he took the rails of the cage into his hands, and shaking them violently endeavoured to break them in pieces; but finding that they did not yield generally, he tried them separately, and having discovered one weaker than the rest, worked at it constantly till he had broken it, and made his escape. On board ship an attempt being made to secure him by a chain tied to a strong staple, he instantly unfastened it, and ran off with the chain dragging behind; but finding himself embarrassed by its length, he coiled it once or twice, and threw it over his shoulder. This feat he often repeated; and when he found that it would not remain on his shoulder, he took it into his mouth.

After several abortive attempts to secure him more effectually, he was allowed to wander freely about the ship, and soon became familiar with the sailors, and surpassed them in agility. They often chased him about the rigging, and gave him frequent opportunities of displaying his adroitness in managing an escape. On first starting he would endeavour to outstrip his pursuers by mere speed, but when much pressed elude them by seizing a loose rope, and swinging out of their reach. At other times he would patiently wait on the shrouds, or at the mast-head, till his pursuers almost touched him, and then suddenly lower himself to the deck by any rope that was near him, or bound along the main-stay from one mast to the other, swinging by his hands, and moving them one over the other. The men would often shake the ropes by which he clung with so much violence as to make me fear his falling, but I soon found that the power of his muscles could not be easily overcome. When in a playful humour he would often swing within arm's-length of his pursuer, and having struck him with his hand, throw himself from him.

Whilst in Java he lodged in a large tamarind-tree near my dwelling, and formed a bed by intertwining the small branches, and covering them with leaves. During the day he would lie with his head projecting beyond his nest, and watching whoever might pass under, and when he saw any one with fruit would descend to obtain a share of it. He always retired for the night at sunset, or sooner if he had been well fed, and rose with

the sun, and visited those from whom he habitually received food.

On board ship he commonly slept at the mast-head, after wrapping himself in a sail; in making his bed he used the greatest pains to remove every thing out of his way that might render the surface on which he intended to lie uneven; and having satisfied himself with this part of his arrangement spread out the sail, and lying down upon it on his back drew it over his body. Sometimes I pre-occupied his bed, and teased him by refusing to give it up. On these occasions he would endeavour to pull the sail from under me, or to force me from it, and would not rest till I had resigned it. If it was large enough for both he would quietly lie by my side. If all the sails happened to be set he would hunt about for some other covering, and either steal one of the sailor's jackets or shirts that happened to be dry, or empty a hammock of its blankets. Off the Cape of Good Hope he suffered much from low temperature, especially early in the morning, when he would descend from the mast shuddering with cold, and running up to any one of his friends climb into their arms, and clasping them closely, derive warmth from their persons, screaming violently at any attempt to remove him.

His food in Java was chiefly fruit, especially mangostans, of which he was exceedingly fond. He also sucked eggs with voracity, and often employed himself in seeking them. On board ship his diet was of no definite kind. He ate readily of all kinds of meat, and especially raw meat; was very fond of bread, but always preferred fruits when he could obtain them.

His beverage in Java was water; on board ship it was as diversified as his food. He preferred coffee or tea, but would readily take wine; and exemplified his attachment to spirits by stealing the captain's brandy-bottle. After his arrival in London he preferred beer and milk to any thing else, but drank wine and other liquors.

In his attempts to obtain food he offered us many opportunities of judging of his sagacity and disposition. He was always very impatient to seize it when held out to him, and became passionate when it was not soon given up, and would chase a person all over the ship to obtain it. I seldom came on deck without sweatmeats or fruits in my pocket, and could never escape his vigilant eye. Sometimes I endeavoured to evade him by ascending to the mast-head, but was always overtaken or intercepted in my progress. When he came up with me on the shrouds, he would secure himself by one foot to the rattling, and confine my legs with the other, and one of his hands, whilst he rifled my pockets. If he found it impossible to overtake me, he would climb to a considerable height on the loose rigging, and then drop suddenly upon me. Or if, perceiving his intentions, I attempted to descend, he would slide down a rope, and meet me at the bottom of the shrouds. Sometimes I fastened an orange to the end of a rope, and lowered it on deck from the mast-head, and as soon as he attempted to seize it, drew it rapidly. After being several times foiled in endeavouring to obtain it by direct means, he altered his plan. Appearing to care little about it, he would remove to some distance, and ascend the rigging very leisurely for some time, and then by a sudden spring catch the rope which held it. If defeated again by my suddenly jerking the rope, he would at first seem quite in despair, relinquish his effort, and rush about the rigging screaming violently. But he would always return, and again seizing the rope, disregard the jerk, and allow it to run through his hand till within reach of the orange; but if again foiled would come to my side, and taking me by the arm, confine it whilst he hauled the orange up.

This animal neither practises the grimace and antics of other monkeys, nor possesses their perpetual proneness to mischief. Gravity approaching to melancholy and mildness were sometimes strongly expressed in his countenance, and seemed to be the characteristics of his disposition. When he first came among strangers he would sit for hours with his hand upon his head, looking pensively at all around him; or when much incommoded at their examination, would hide himself beneath any covering that was at hand. His mildness was evinced by his forbearance under injuries which were grievous before he was excited to revenge; but he always avoided those who often teased him. He soon became strongly attached to those who used him kindly. By their side he was fond of sitting, and, getting as close as possible to their persons, would take their hands between his lips, and fly to them for protection. From the boatswain of the Alceste, who shared his meals with him, and was his chief favourite, although he sometimes purloined the grog and the biscuit of his benefactor, he learned to eat with a spoon, and might be often seen sitting at his cabin-door enjoying his coffee quite unembarrassed by those who observed him, and with a grotesque and sober air that seemed a burlesque on human nature.

Next to the boatswain I was perhaps his most intimate acquaintance: he would always follow me to the mast-head, whither I often went for the sake of reading apart from the noise of the ship; and having satisfied himself that my pockets contained no eatables, would lie down by my side, and pulling a topsail entirely over him, peep from it occasionally to watch my movements.

His favourite amusement in Java was in swinging from the branches of trees, in passing from one tree to another, and in climbing over the roofs of houses; on board in hanging by his arms from the ropes, and in romping with the boys of the ship. He would entice them into play by striking them with his hand as they passed, and bounding from them, but allowing them to overtake him, and engaging in a mock scuffle, in which he used his hands, feet, and mouth. If any conjecture could be formed from these frolics of his mode of attacking an adversary, it would appear to be his first object to throw him down, then to secure him with his hands and feet, and then wound him with his teeth.

Of some small monkeys on board from Java he took little notice whilst under the observation of the persons of the ship. Once, indeed, he openly attempted to throw a small cage containing three of them overboard, because, probably, he had seen them receive food of which he could obtain no part. But although he held so little intercourse with them when under our inspection, I had reason to suspect that he was less indifferent to their society when free from observation, and was one day summoned to overlook him playing with a young male monkey. Lying on his back, partially covered with the sail, he for some time contemplated with great gravity the gambols of the monkey, which bounded over him, but at length caught him by the tail, and tried to envelope him in his covering; the monkey seemed to dislike the confinement and broke from him, but again renewed its gambols, and although frequently caught, always escaped. The intercourse, however, did not seem to be that of equals, for the orang-outang never condescended to romp with the monkey as he did with the boys of the ship. Yet the monkeys had evidently a great predilection for his company, for whenever they broke loose they took their way to his resting-place, and were often seen lurking about it or creeping clandestinely towards him. There appeared to be no gradation in their intimacy, as they appeared as confidently familiar with him when first observed as at the close of their acquaintance.

But although so gentle, when not exceedingly irritated, the orang-outang could be excited to violent rage, which he expressed by opening his mouth, showing his teeth, and seizing and biting those who were near him.

Sometimes, indeed, he seemed to be almost driven to desperation, and on two or three occasions committed an act which, in a rational being, would have been called the threatening of suicide. If repeatedly refused an orange when he attempted to take it, he would shriek violently and swing furiously about the ropes, then return and endeavour to obtain it; if again refused, he would roll for some time like an angry child upon the deck, uttering the most piercing screams, and then suddenly starting up, rush furiously over the side of the ship and disappear. On first witnessing this act, we thought he had thrown himself into the sea, but, on a search being made, found him concealed under the chains.

I have seen him exhibit violent alarm on two occasions only, when he appeared to seek for safety in gaining as high an elevation as possible. On seeing eight large turtle brought on board, whilst the Cæsar was off the Island of Ascension, he climbed, with all possible speed, to a higher part of the ship than he had ever before reached, and looking down upon them, projected his long lips into the form of a hog's snout, uttering at the same time a sound which might be described as between the croaking of a frog and the grunting of a pig. After some time he ventured to descend, but with great caution, peeping continually at the turtle, but could not be induced to approach within many yards of them. He ran to the same height, and uttered the same sounds, on seeing some men bathing and splashing in the sea; and after his arrival in England, he showed nearly the same degree of fear at the sight of a live tortoise.

Such were the actions of this animal, continues Dr. Abel, as far as they fell under my notice during our voyage from Java, and they seem to include most of those which have been related of the orang-outang by other observers. I cannot find that after his arrival in England he learnt to perform more than two feats which he did not practise on board ship, although his education has been by no means neglected. One of these is to walk upright or rather on his feet, unsupported by his hands; the other, to kiss his keeper. I have before remarked with how much difficulty he accomplishes the first; and may add, that a well trained dancing dog would far surpass him in the imitation of the human posture. I believe that all figures given of orang-outangs in an unpropped and erect posture are wholly unnatural.

During the time this animal was in the custody of Mr. Cross, there was no need of personal confinement, and little of restraint or coercion; to his keepers especially, and to those whom he knew by their frequent visits, he displayed a decided partiality. During his last illness, and at his death, his piteous appearance, which seemed to bespeak his entreaties to those about him for relief, excited the feelings of all who witnessed them, and recalled strongly to the mind the recollection of human sufferings under similar circumstances.

THE RUINS OF MYCENÆ.

THOUGH the remains of ancient Greece have been explored with so much industry and skill by several travellers of late years, and particularly by some of our own countrymen, there is little doubt that if Greece can obtain a settled government under the new monarch who has lately gone there, future inquirers will have better opportunity of prosecuting researches by digging or other means, than any scholar has hitherto enjoyed. Much may yet be discovered by removing the accumulated rubbish of ages, and at all events, new inquirers, if they do nothing more, will extend and correct our knowledge of what is already discovered.

The remains of Greek temples, of which several views have been given in this Magazine, are certainly the most striking and attractive of the imperishable monuments of Grecian art; but there are ruins of another description, belonging to the character of military architecture, that are no less worthy of attention. If the traveller lands at the port of Nauplia, or Napoli, or Anápli, as it is sometimes called in the Morea, and proceeds about ten miles northwards in the plain of Argos, he will come to the remains of the ancient city of Mycenæ, once the capital of Agamemnon, who, according to the Iliad of Homer, was the commander-in-chief of the assembled Greeks before the walls of Troy. This event took place (following the received chronology) about B.C. 1184. We cannot indeed assert that the ruins of Mycenæ are not the remains of some buildings erected *after* the war of Troy; but all the arguments seem in favour of considering them of higher antiquity than that epoch.

Mycenæ stands near the extremity of the plain of Argos, on a rugged eminence between two summits of that range of hills which here bound the plain. This may be called an Acropolis, like the rocky height at Athens, on which the remains of the temple of Minerva (the Parthenon) now stand. The length of the Acropolis of Mycenæ is about four hundred yards and its breadth about two hundred; and the unevenness of the surface, as well as some interior remains, show that it was divided into different parts. The whole circuit of this citadel can still be made out; and in some places the walls remain to the height of fifteen or twenty feet. They are constructed of huge stones, and belong to that style of building commonly named Cyclopean, from certain unknown personages called Cyclopes by the Greek writers, who appear to have been very busy workmen, as we find their labours in many parts both of Italy and Greece. This description of wall-building is recognized by its massy materials, and by a certain style of rudeness; in which, however, different orders or epochs are easily distinguished. The oldest part of the walls of Mycenæ resembles the Cyclopean walls of Tiryns, a place to the south about seven miles distant, which are apparently nothing more than huge masses of unwrought stone, placed one above another, with the interstices filled up by smaller materials. Such structures belong to an early stage in architectural experiments, as we may see in the massy walls of the Peruvians, and the remains of Stonehenge and Avebury in our own country.

The citadel of Mycenæ is of an irregular oblong form, and is now chiefly an object of curiosity for the gate or great entrance at the north-west angle. The approach to this gate is by a passage 50 feet long and 30 wide, formed by two parallel and projecting walls, which were a part of the fortification, and were obviously designed to command the entrance, and annoy any enemy who might venture to attack the place.

The door-way is somewhat narrower at the top than the bottom, which we find also to be the case in Peruvian, and in some Egyptian door-ways, but not, we believe, in the oldest architectural remains of the latter country. The width of the door at Mycenæ at the top is 9½ feet. It is formed of three stones, two uprights, the height of which is not yet known, as they are buried a considerable depth in the earth; and a cross stone forming a soffit. This last is 15 feet long, 4 wide, and 6 feet 7 inches thick in the middle, but diminishes towards each end. On this stone stands another of a triangular shape, which is 12 feet long, 10 high, and 2 thick. Two lions are cut in relief on the face of this stone, standing on their hind-legs, on opposite sides of a round pillar, on which their fore-paws rest. "The column," says Colonel Leake *, who is our authority for the present description, "becomes broader towards the top, and is surmounted with a capital formed of a row of four circles, enclosed between two parallel fillets." The top of the stone with the heads of the lions

* Travels in the Morea. London, 1830.

is wanting, and perhaps something is gone from the top of the pillar between them. This singular gateway is described by a Greek traveller of the second century of our era (Pausanias, book ii. chap. 16) in the following words:—"Mycenæ was destroyed by the people of Argos through jealousy; but there still remain parts of the wall and the gate, which has lions over it. It is said that all this was the work of the Cyclopes, who built the walls of Tiryns for Proetus." The destruction of Mycenæ, here alluded to, took place B.C. 468; and though there are traces of some later repairs about the place, we have no reason to think that it was ever inhabited after that time by any considerable numbers: in the time of Pausanias it was deserted, and still remains so, and probably hardly a single change has taken place from the visit of Pausanias down to the present time. The barbarians, who have used so freely the well-cut stones of Grecian temples to construct modern edifices, have not taken the pains to carry off the massive materials of Mycenæ and Tiryns.

Attempts have been made to explain the meaning of the two lions cut in stone, but there is not a single satisfactory point of comparison with other works of Grecian art that will help us in the conjecture. The lion has been in all countries and ages a favourite subject for sculpture; but the origin of this practice we do not conceive to have any connection with a religious idea.

Besides the walls and gateways of Mycenæ (for there is also a postern-gate of smaller dimensions), we find the remains of four chambers, constructed in a peculiar way, which we may probably at some future opportunity describe. One of them is called the treasury of Atreus, according to an old tradition which had been handed down to the time of Pausanias.



[The Gate of Mycenæ.]

Tranquillity.—One day brings on another day, one year follows another: let us take the time as it comes. A hundred years of trouble are not worth a day of tranquillity. The source of all pleasures is in our own heart; he who seeks them elsewhere outrages the Divinity. My projects, my desires, and my hopes never go beyond my own bosom. Rivers roll rapidly to the sea and enter therein without troubling it: my heart is the same; all the events of the great world do not cost me a single care. Truth is my compass, and moderation my helm. I advance on my way whatever wind may blow. The clouds arise and the clouds descend in rain without causing me any inquietude. When they conceal the sun from me by day I try to look at the stars by night. The swallow in her safe nest sees with a tranquil eye the bloody combats of the vultures. Let who will conquer the conqueror will not molest her; and the little flies and worms never fail her. My clothes are made of common cloth, my food is coarse, and the thatch which covers my hut decays every year. But what would it be to me to-morrow to have been dressed in silk to-day and to have digested costly dishes? Golden roofs do not keep out sleeplessness and care; and were the country shaken by an earthquake how easily can I gain my humble door! My patrimony is at the end of my two arms, and every day gives me its harvest. When it is hot I cool myself in the shade of a tree, and when it is cold I warm myself by working. Old age is coming upon me: but my children are young, and will repay me for what I have done for them. If they always observe truth and moderation a hundred years will not cost them a sigh. Whatever tempests may arise Tranquillity is a port always open to the innocent of heart. Hail tranquillity of the soul! Sweet charm of life! Kings would sell their crowns to buy thee if they knew thy value. Complete thy benefits: thou hast helped me to live well—help me to die well.—*Translation of a Chinese poem, attributed to a celebrated doctor named Lean.*

⁎ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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THE MANCHESTER AND LIVERPOOL RAIL-ROAD.



[Entrance of the Tunnel at Edge Hill.]

The increased rapidity of travelling is one of the most remarkable features of the present age. Remote places are, by this means, virtually brought near to each other; and thus, while intelligence is diffused, an impulse is given to commerce, each of which advantages most powerfully affects the condition of the people. The benefits of cheap and quick communication to a great commercial state are too evident to require to be enlarged upon. Time and money are thus most importantly saved; and the rapid and economical transit of goods, by lessening their cost, enables the humblest to partake of comforts which were formerly considered as luxuries only for the rich.

Of all the local improvements made with this object, in modern times, the Manchester and Liverpool Railway is the most remarkable. Its completion forms an epoch in the history and application of mechanical power. If only ten years back it had been said, that persons could pass, without inconvenience and without danger, over a distance of thirty-one miles in one hour, the tale would have been treated as one of those visionary stories which in former days were the amusements of the nursery.

The advantages of railways over common roads consists in the great diminution of friction which they occasion, whereby given weights may be drawn through equal distances at a much less expense of power. Many experiments have been made in order to ascertain the economy of power which they produce. The most moderate calculations estimate the resistance on a level turnpike-road to be more than seven times as great as that on a level rail-road*; while, by some experiments, it has been found that the traction† of the wheels on a level road is to that on a good rail-road as twenty to one‡.

It is at once evident, that a smooth wheel will roll along a smooth plane of iron much easier than it will roll along a plane covered with rough and loose stones; for in the latter case, it has either to be lifted over the inequalities, or it has to push them on one side as it passes, or to crush them. But the crushing of the rough material, or the pushing it aside, is so much

* Wood on Railroads, p. 279.

† The traction of the carriage is only part of the resistance [illegible]. This resistance is [illegible] into two separate [illegible] arising from the friction or attrition of the rubbing parts, and [illegible] the obstruction to the rolling of the wheels upon the road.

‡ Gordon's Practical Treatise upon Elemental Locomotion, p. [illegible]

waste of power; and hence the great advantages of a smooth road*.

Rail-roads on an extended scale are of very recent application; although for the last two centuries they have, with various modifications, been adopted in the collieries of Northumberland, where the expense of conveying so heavy an article as coals by ordinary methods first showed the necessity for discovering some plan by which the labour might be lessened. Up to the year 1600, it appears that coals were conveyed from the collieries in carts on common roads, and in some cases in baskets on the backs of horses. The precise period when any improved method of conveyance was first attempted is not ascertained, but this was certainly between the years 1602 and 1649. Rail-roads were about that time first adopted. They were then made of timber; and, though very rude in their construction, materially diminished the resistance, and therefore economised the power.

These wooden rails consisted of parallel oaken blocks placed transversely on the road at intervals of from two to three feet, and fastened firmly into the ground; long thick pieces of wood of about six or seven inches in breadth were laid on these, securely fastened to them and joined together at the different lengths by pins, forming two continuous parallel lines on which the wheels of the waggon traversed. These roads were very imperfect and perishable. The timber was soon worn away by the attrition of the wheels, and repairs were constantly required; the holes made in the transverse blocks or sleepers became too large for the pins after these had been once or twice displaced in order to renew the rails; while the constant treading of the horses' feet weakened and ultimately destroyed the blocks in the middle, and they were in consequence soon made inefficient. To remedy this evil an improvement called the double rail-way was made. This consisted in laying other pieces of wood on the first, to which they were fastened by pins. These upper pieces could therefore be renewed when worn out without injury to the other parts; and as the rails were raised from the ground the sleepers could be covered and secured from the action of the horses' feet. Such roads were still, however, of rude formation, and were liable to be constantly out of repair, notwithstanding which they were long used with little or no alteration at the collieries of Northumberland and Durham. The regular load of a horse with a cart along the common road was 17 cwt., while on this rail-road it was 42 cwt. The advantage so gained appears to have been thought quite sufficient; and no farther economy of power was for some time sought to be obtained. Where there were any acclivities or abrupt curves, thin pieces of wrought iron were nailed over those parts of the rail to diminish the resistance opposed to the wheels; and so that one horse could draw 42 cwt., the required maximum of power, no farther effort was considered necessary.

Until within a very few years rail-roads have been considered as only supplementary to canals,—to be employed in short distances, or where the nature of the ground has precluded the application of inland navigation. Accordingly, while the attention of some of the most enterprising and highly gifted minds was turned to the consideration of the important point of inland water communication, the better construction of rail-roads was overlooked and neglected. This country is now every where traversed by canals, intersecting each other, which afford inland navigation between all parts of the kingdom. This very excellence for a long time seemed to preclude the necessity of any farther improvements in the facility of communication.

The superiority of rail-ways is however very great, where celerity of motion is required, as this cannot be obtained with the same economy on canals, through the employment of horse-power. When locomotive carriages are substituted on rail-roads, the difference is rendered still more striking. It has been found by experiment that at the rate of two miles an hour, a horse can drag three times as much weight in a boat on a canal as he can drag upon a carriage on a rail-road. At the rate of three miles and a half an hour, his power exerted on the rail-road, or in tracking on the side of a canal, is exactly the same. But at an increase of speed beyond this rate, the disproportion in favour of rail-roads becomes very great; so that at the rate of six miles an hour, owing to the resistance of the water, he can draw upon the rail-road a weight three times heavier than he can draw in a boat on a canal. As the velocity is increased the difference becomes still greater *.

It is now between fifty and sixty years since iron has been gradually substituted for wood on rail-roads, and their construction has by degrees become better understood and executed. The date of the first introduction of cast and wrought iron rail-ways, is variously stated in different accounts; it is most probable that iron was substituted for wood in several places without any concert, and that the adoption of cast iron was not the result of any one discovery. From 1768 to 1776 is the period when the plate-rail-road (more generally known as the tram-road) was first used. This, with but slight modifications, is the same as the plate-rail of the present day. It consists of cast iron rails about four feet long, having a flange or upright ledge three inches high, to keep the wheel upon the horizontal part, which is about four inches wide and an inch thick, and another flange at the other side projecting downwards to strengthen the rail. These rails are fixed together and fastened securely to stone supports. At first they were made to rest on the transverse wooden blocks, already described, stretched across the whole breadth of the rail-road, or upon short square wooden sleepers: stone blocks are now mostly used. An improvement of the plate-rail is the edge-rail, which is now most generally adopted. The advantage of the edge over the plate-rail, is the diminution of friction. In this case the ledge is placed on the wheel instead of the rail, and it is found that a ledge of one inch depth is sufficient to keep it in its situation.

It has been found by experiment that on a well-constructed rail-road a horse will draw

10 tons at the rate of	2	miles an hour.
$6\frac{1}{2}$	. . .	3	"
5	. . .	4	"
4	. . .	5	"
$3\frac{1}{2}$	. . .	6	"

But it must be borne in mind that the great superiority of a rail-way over a common road can only exist on an exact level. Let there be an ascent so small as scarcely to attract observation, and this advantage is at once very materially diminished; while, at greater elevations, it is entirely lost. Since the traction of the wheels is so much less on rail-ways than on common roads, it follows that when the force of gravity is brought into operation by an ascending plane, this opposing force, being proportioned to the load, will be much greater than on a common road. It has been found by experiment, that if a locomotive engine draws, by the adhesion of its four wheels, 57.25 tons on a level, it will only draw, by the same adhesion, 15.21 up an inclination of

* Mr. Telford's Report on the state of the Holyhead and Liverpool roads contains the result of some experiments on different roads, by which it is found that

	lbs.
On well-made pavement the draught is	33
On a broken stone surface, or old flint road	65
On a gravel road	147
On a broken stone road, upon a rough pavement foundation	46
On a broken stone surface, upon a bottoming of concrete formed of Parker's cement and gravel	46

* Wood on Railroads, p. [illegible].

one in a hundred; at an inclination of one in fifty, it will draw scarcely any load; and at an inclination of one in twelve, a locomotive engine will not ascend by itself on a rail-way, the force exerted causing the wheels to turn round on the same spot instead of advancing. Abrupt curves and sudden turnings increase resistance very much. The medium friction of a train of five waggons on a level rail-way was found by experiment to be nine pounds per ton; while on a curved part, with a radius of about eight hundred feet, it was eighteen pounds per ton *.

In the formation of rail-ways for the general purposes of traffic, it is therefore essential to their beneficial effect that they should be made as nearly as possible on a level straight line. Most of the rail-ways heretofore constructed have been for the conveyance of the products of the mines,—such as of coals from the pits to the river side; and since the weights were all to be carried in one direction, the road had an inclination downwards given to it, requiring no power but that of gravity to produce locomotion. Where the traffic is to and fro, this arrangement must of course be abandoned.

Since the close of the last century rail-ways have multiplied extremely in the neighbourhood of our collieries and other mining districts. In Glamorganshire alone it is estimated that there are three hundred miles of railways †. These are, however, all detached, isolated, and private undertakings, appropriated solely to the conveyance of mineral produce to those points where water communication is established.

The Stockton and Darlington Rail-way was the first laid down, by Act of Parliament, for the conveyance of general merchandize and passengers, as well as of coals. This road was opened in the autumn of 1825. It is about twenty-five miles in length; and consists of only a single rail-way, having at intervals of every quarter of a mile "sidings" to allow of the carriages passing each other.

The project of a rail-way between Liverpool and Manchester was first entertained in 1822. Before so great and novel an undertaking could be carried into execution, many preliminary measures were necessary, and much opposition was to be expected from those whose interest might possibly be affected by the successful issue of the project. A company was formed under the title of "The Liverpool and Manchester Rail-road Company," and their prospectus was issued in October, 1824. £400,000 was to be raised by shares of £100 each. It was found, subsequently, that this sum was inadequate to the purpose. A bill was brought into Parliament for the formation of the rail-way in 1825. The opposition made to the measure was so strenuous, however, that it was not till the ensuing session that the company succeeded in its application.

The peculiar connection between Liverpool and Manchester renders a rapid and cheap communication between these places a subject of national interest and importance. Liverpool is the port whence Manchester receives all her raw material, and to which she returns a large portion of her manufactured goods for shipment to all parts of the world. This constant and increasing interchange of merchandize, and, in consequence, the incessant intercourse of the inhabitants of the two towns, must in an eminent degree be promoted and facilitated by a quickness of transit hitherto supposed impossible. It is true, there is water communication between Liverpool and Manchester by two separate routes; namely, on the river Mersey, from Liverpool to Runcorn, a distance of sixteen or eighteen miles; and thence, either by the Duke of Bridgewater's canal, or by a navigation consisting alternately of canals and the rivers Mersey and Irwell. The whole distance by water is about fifty miles. The average length of passage by these conveyances is about thirty-six hours, varying according to the state of the wind and the tide. By the rail-road the transit of goods is effected in about two hours. The economy of time in transport is of the greatest importance in all large commercial operations; and certainty of delivery is an equally important element in the saving of capital. The cotton spinner is no longer required to keep large stocks of the raw material in his warehouse at Manchester. He buys at the hour when he finds it most advantageous to buy, assured that the delivery of the goods will immediately follow the completion of the contract. Manchester may now be considered as the great cotton factory of most parts of the globe; and the constantly increasing traffic betweeen this place and Liverpool, could not be carried on by the canal establishments with sufficient despatch, regularity, and punctuality, at all periods and seasons. The different position of these towns in 1760, when first the Duke of Bridgewater's canal was projected, and in 1824, when the rail-road company was formed, shows the rapid increase of their commercial importance. In 1760 the population of Manchester was about 22,000; in 1824 it was 150,000. In 1790 the first steam-engine was used in Manchester; in 1824 more than two hundred steam-engines were at work, and nearly 30,000 power-looms. In 1760 the population of Liverpool was about 26,000; in 1824 the population was 125,000. In 1760 the number of vessels which paid dock-dues was 2,560; in 1824 this number amounted to 10,000. In 1784 eight bags of cotton were seized by the custom-house officers out of an American vessel arriving at Liverpool, under the conviction that they could not be the growth of America. In 1824 there were imported into Liverpool from America 409,670 bags of cotton *. The quantity of goods daily passing between Manchester and Liverpool was estimated in 1824 at 1,000 tons, but since that period it has much increased.

The legislature having concurred in the practicability and advantages of the rail-way, the undertaking was commenced in June, 1826, under the direction of Mr. George Stephenson. It was proposed to lay the railway as nearly as possible in a straight line between the two places. The nature of the country rendered this undertaking a task of no ordinary difficulty. Tunnels were to be made; eminences to be excavated, artificial mounds to be erected; and a moss (Chat Moss), four miles in extent, was to be drained and levelled in the centre and embanked at each end. This latter was a most arduous task, and the practicability of carrying it into execution was seriously questioned in the House of Commons; by some of the witnesses who were examined it was deemed impossible, and one asserted that it could not be accomplished at the cost of £200,000 †. Chat Moss is a "huge bog," of so soft and spongy a texture, that cattle cannot walk over it. The bottom is composed of clay and sand, and above this, varying in depth from ten to thirty-five feet deep, is a mass of vegetable pulpy matter. This barren waste comprises an area of about twelve square miles; and, according to moderate calculation, contains at least sixty millions of tons of vegetable matter.

The first actual operations of the company were directed to the draining of this moss. Many difficulties occurred in the progress of the work, but they were all at length overcome. On the eastern border an embankment of about twenty feet had to be raised above the natural level. The weight of this embankment pressed down the surface of the moss, and

* Milne's Practical View of the Steam-engine (Appendix). From the same authority it appears that the draught on a rail-road was one hundred and eight pounds per ton, at the rate of three miles an hour when the rails were dry, and only sixty-eight pounds when the rails were wet.

† Dupin, vol. i. p. 207.

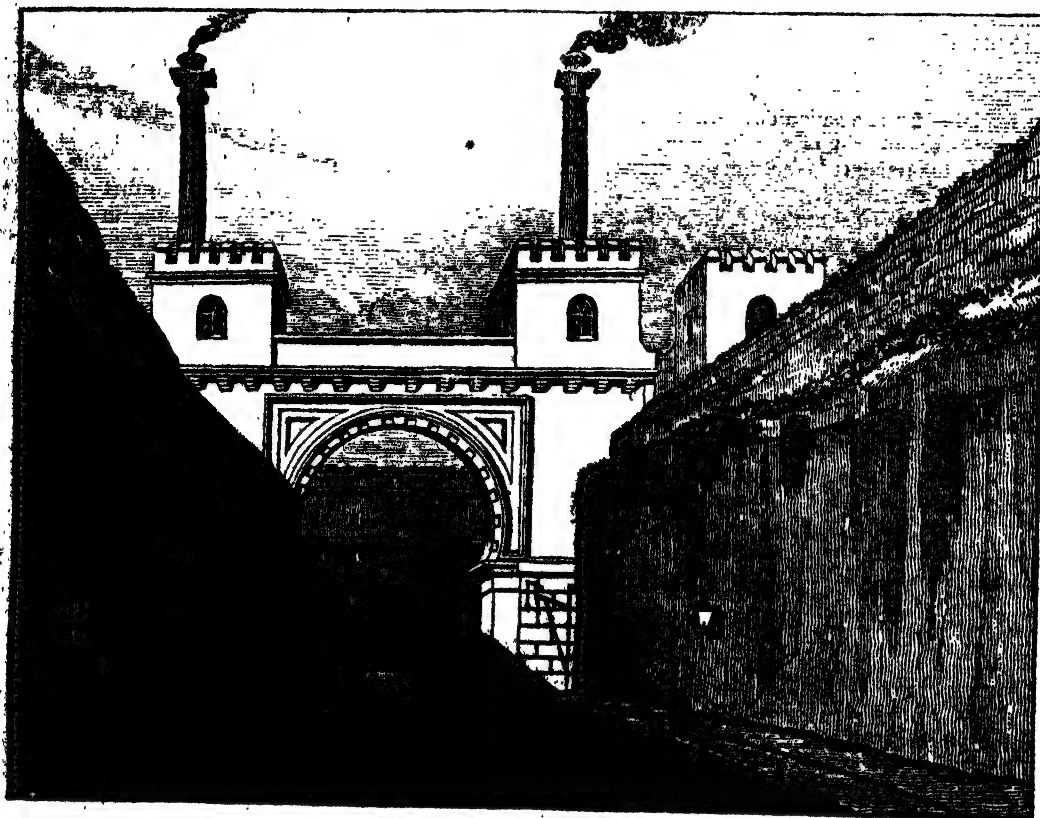
* These statistical facts are taken from Booth's Account of the Manchester and Liverpool Rail-way, p. 3.

† In the general abstract of expenditure, the Chat Moss account is put down at £27,719. 11s. 10d.

many thousand cubic yards gradually disappeared. Perseverance, however, at length succeeded in consolidating the moss, and giving to it an equable pressure. On the western side an embankment is formed of moss, nearly a mile in length, and from ten to twenty feet perpendicular height, at an inclination of rather less than forty-five degrees, which was found from experience to stand better than if at a greater angle. Sand and gravel, from two to three feet in depth, were laid over this; and on the whole so prepared, the permanent road, consisting of a layer of broken stone and sand, was deposited.

At one part, about three-quarters of a mile from the western edge, distinguished as the "Flow Moss," the semi-fluid consistency of the moss required some farther contrivances to render it sufficiently firm. Hurdles were placed upon it, thickly interwoven with twisted heath, forming a platform on which sand and gravel are laid, and on which the wood sleepers which support the rails are placed. The quantity of moss required for the embankments, and which was dug from the neighbouring parts, amounted to five hundred and twenty thousand cubic yards.*

The rail-way enters Liverpool by means of a tunnel and inclined plane, thus effecting a communication with the docks without interfering with a single street, a passage being formed in fact underneath the



[Moorish Arch.]

town. The first shaft of this tunnel was opened in September, 1826. Very little progress was made in this work for the first few months from its commencement, but during the whole of the ensuing year the operations were carried on with great perseverance and activity. This tunnel is twenty-two feet wide and sixteen feet high; the sides are perpendicular for five feet in height, surmounted by a semi-circular arch of twenty-two-feet diameter; the total length is two thousand two hundred and fifty yards. The entrance in the Company's yard in Wapping, is by an open cutting twenty-two feet deep and forty-six wide, affording space for four lines of rail-way. Between the lines are pillars. For the length of two hundred and eighty yards the rail-way is perfectly level, curving to the south-east. Over this part are the Company's warehouses, to which there are hatchways or trap-doors, allowing the waggons placed underneath to be readily loaded or unloaded. The inclined plane, which is a perfectly straight line, commences here: it is one thousand nine hundred and seventy yards in length, with a uniform rise of 1 in 48, the whole rise from Wapping to the tunnel-mouth at Edge-hill being one hundred and twenty-three feet. A considerable portion of this excavation was hewn through a solid rock, consisting of a fine red sand-stone, which forms in these parts a natural roof, requiring neither props nor artificial arching. But in some places the substance excavated was with difficulty supported till the masonry which formed the roof was erected. The construction of this tunnel was commenced in seven or eight separate lengths; upright shafts being opened in each of these places, communicating with the surface, and through which the substance excavated was conveyed away. The accuracy of the work rendered the joinings exact and perfect in every case. In the early part of September, 1828, the whole was completed at a cost of £34,791. The depth of the super-stratum of earth, from the roof of the tunnel to the open surface of the ground varies from five to seventy feet. The whole length of the tunnel is furnished with gas-lights, suspended from the centre of the arched roof, at distances of twenty-five yards apart; and the sides and roofs are white-washed, for the better reflection of the light. At the upper end of the inclined plane the tunnel terminates in a spacious area, forty feet below the surface of the ground, cut out of the solid rock, and surmounted on every side by walls and battlements. From this area there returns another small tunnel, quite distinct from the larger one, and communicating with the upper part of Liverpool. Its dimensions are two hundred and ninety yards in length, fifteen feet wide, and twelve feet high. It terminates in the Company's premises in Crown Street, which is the principal station for the rail-way coaches. Above this area on the surface of the ground two steam chimneys are erected of one hundred feet in height;

* 'Companion to the Almanac for 1829,' p. 228

these are built in the form of columns, with handsome capitals. In the area below are two stationary engines, by which the loaded waggons are drawn up the inclined plane. Proceeding eastward from the two tunnels, the road passes through a Moorish arch-way, erected from a design of Mr. Foster. This connects the two engine-houses, and forms the grand entrance to the Liverpool stations.

The road in this part curves slightly, but is perfectly level for one thousand yards; it then for the length of five miles and a half has a fall of only 1 in 1092, or of four feet in a mile,—a declivity so slight and uniform as not to be perceptible. This nearly level line was not obtained without much labour. A little beyond the perfect level the road has been formed in a deep excavation made through marl. Beyond this, about half a mile to the north of the village of Wavertree, is a passage cut through a steep eminence, called Olive Mount, the substance of which is entirely rocky. This deep and narrow ravine, formed in the solid rock, is more than two miles in extent, and in the deepest part is seventy feet below the surface of the ground; the road here is little more than sufficiently wide for two trains of carriages to pass each other. It winds gently round to the south-east, and the view is bounded by the perpen-



[Olive Mount Excavation.]

dicular rock on either side. Four hundred and eighty thousand cubic yards of stone have been dug out of this excavation, and have been made available to the building of bridges and walls on this portion of the line. Over the marl and the Olive Mount excavations are several bridges to form the requisite communications between the roads and farms on the opposite sides of the rail-way. Emerging from the Olive Mount cutting, the road is thence artificially raised by the great Roby embankment, which is nearly three miles long, varying in height from fifteen to forty-five feet, and in breadth at the base from sixty to one hundred and thirty-five feet. This is formed of the materials dug out from the various excavations. The quantity employed was 550,000 cubic yards. After passing the Roby embankment the rail-way crosses, by means of a bridge, over the Huyton turnpike-road; and proceeds in a slightly curved direction to Whiston, between seven and eight miles from the station at Liverpool. Here the rail-road continues for a mile and a half in a straight line, having in this length an inclination of 1 in 96; at the top of this inclined plane the road runs nearly two miles on an exact level, produced by the excavation of 220,000 cubic yards. Over this part, called Rainhill level, the turnpike road between Liverpool and Manchester proceeds, crossing the line of rail-way at an acute angle of 34°, by means of a substantial stone bridge. At the other side of this two miles of level is the Sutton inclined plane, which is similar in extent and inclination to the Whiston plane, descending from Rainhill in the opposite direction. A little distance thence is Parr Moss, over which the road is carried. This Moss is twenty feet deep, and extends three-quarters of a mile in the line. The materials for the road which forms the rail-way on this unsubstantial matter was obtained from the excavations of the Sutton inclined plane, which produced 144,000 cubic yards of clay and stone The heavy deposit sank to the bottom, and now forms with the moss a firm embankment, in reality twenty-five feet high, though only four or five feet above the surface of the other parts of the moss. Not very far from this, and about half way between Liverpool and Manchester, is the valley of the Sankey, at the bottom of which the canal flows. Over this valley, without interruption to its navigation, the rail-way is carried along a magnificent viaduct, supported on nine arches; each arch is fifty feet span, and varies from sixty to seventy feet in height; these are built principally of brick with stone facings; the width of the rail-way between the parapets is twenty-five feet. The *piling* for the foundation of the piers of this great viaduct was a business of much labour and cost, but indispensable for the security of the superstructure. About two hundred piles, varying from twenty to thirty feet in length, were driven hard into the foundation site of each of the ten piers.

The approach to this structure is by an embankment attaining to the height of sixty feet. This is formed

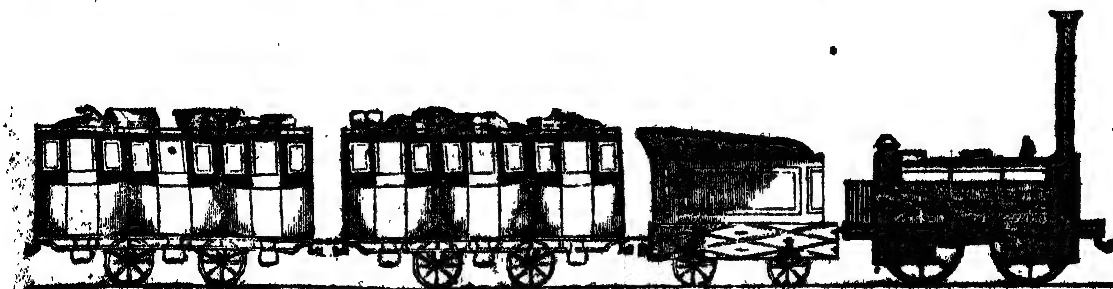
principally of clay dug out from the high lands on the borders of the valley. Not far from Sankey is Newton, near to which town the rail-way crosses a narrow valley by a short but lofty embankment, and by a handsome bridge of four arches, each having forty feet span. The turnpike-road from Newton to Warrington passes under one of these arches, and beneath another flows a small river. At Kenyon, a few miles beyond Newton, is an excavation of greater magnitude than any other on the line, 800,000 cubic yards of clay and sand having been dug out of it. Near the end of this cutting the Kenyon and Leigh Junction Rail-way joins the Liverpool and Manchester line by two branches, pointing to the two towns respectively. This rail-way joins the Bolton and Leigh line, and thus forms the connecting link between Bolton, Liverpool, and Manchester. After the Kenyon excavation is the Brosely embankment, and a little beyond that commences the Chat Moss. The difficulties overcome here have already been briefly described; and now, by the ingenuity and perseverance of man, trains of carriages of many tons weight are constantly passing and repassing over a bog, which originally would not allow of a person walking over it except in the driest weather. About a mile from the extremity of the moss the rail-way crosses the Duke of Bridgewater's canal, by a neat stone bridge of two arches. Some little distance beyond is the village of Eccles, four miles from Manchester. Through this extent is an excavation from which 295,000 cubic yards of earth have been dug out. At Manchester the rail-way crosses the river Irwell by a very handsome stone bridge, of two arches of sixty-five feet span, thirty feet from the water; and then over a series of twenty-two arches, and a bridge, to the Company's station in Water-street. The whole line of road is a distance of thirty-one miles.

It was a matter of some importance to determine whether cast or wrought iron rails should be used for this undertaking; each description had its advocates; but after deliberation and inquiry, those of wrought iron obtained the preference. These were made in lengths of five yards each, weighing thirty-five pounds per yard. The blocks, or sleepers, are some of stone and some of wood. Those of stone contain nearly four cubic feet each; they are laid along about eighteen miles. The wood sleepers are made of oak or larch; and are principally laid across the embankments, and across the two districts of moss, wherever it is expected that the road may subside a little. The stone blocks are let firmly into the permanent road, which consists of a layer of broken rock and sand about two feet thick, one foot of which is placed below the blocks, and one foot distributed between them, serving to keep them in their places. They are placed at intervals of three feet; in each block two holes six inches deep and an inch in diameter are drilled, and into these are driven oak plugs. The rails are supported at every three feet on cast-iron chairs or pedestals, into which they are immediately fitted and securely fastened; the chairs are placed on the blocks, and firmly spiked down to the plugs, the whole forming a work of great solidity and strength; the rails are about two inches in breadth, and rise about an inch above the surface; they are laid down with extreme correctness, and consist of four parallel rails four feet eight inches apart, allowing two trains of carriages to pass in opposite directions with perfect safety. Under the warehouses at Liverpool there are four distinct rail-ways for the greater convenience and facility of loading and unloading the waggons.

It may be observed, from the description given of this rail-road, how much the principle was acted upon of making it as far as practicable perfectly *level* and *straight*. With the exception of the two inclined planes at Rainhill, where the inclination is 1 in 96, there is no greater inclination than in the ratio of about 1 in 880. The surface of the rails at the top of the tunnel in Liverpool is forty-six feet above the rail-way at Manchester. Along the whole extent there are no abrupt curves; the curvature rarely exceeds a deviation from a straight line of more than four inches in twenty-two yards.

At the first projection of the rail-road it was by no means decided what kind of power should be employed for locomotion—whether horses or locomotive engines, or fixed engines drawing the load by means of ropes from one station to another. Each of these methods had been tried. The directors were not, however, at a loss to decide from the paucity of evidence brought before them; and the schemes offered by some projectors were of the most various and extravagant nature. Mature consideration, and the experience obtained in other undertakings, satisfied the directors that the employment of horses was entirely out of the question. At length it was determined, in April, 1829, to offer a premium of £500 for the most improved locomotive engine, subject to certain stipulations and conditions.

The trial of the different engines offered, in competition for the reward just mentioned, took place on the 6th of October, 1829, before competent judges, on the level portion of the rail-way at Rainhill. Four steam-carriages were entered on the lists to contend for the premium. The distance appointed to be run was seventy miles, and the engine, when fairly started, was to travel on the road at a speed of not less than ten miles an hour, drawing after it a gross weight of three tons for every ton of its own weight. This distance was to be accomplished by moving backwards and forwards on a level plane of one mile and three-quarters in length, by which arrangement the machine had to pass over the plane forty times, and make as many stoppages. The "Rocket," weighing four tons five hundred weight, performed the distance in less than six hours and a half, including stoppages. The speed at which it travelled was frequently eighteen miles per hour, and occasionally upwards of twenty. In this trial, half a ton of coke was consumed as fuel; coke being used instead of coal to prevent the annoyance of smoke. This engine was the only one which performed the stipulated task. The premium was awarded by the directors to Mr. Booth and the Messrs. Stephenson. Engines similar to the "Rocket" are those now used on the Manchester and Liverpool rail-way. The peculiarities of this engine could not be rendered intelligible without some previous knowledge of the construction of an ordinary steam-engine. The following cut exhibits its external appearance.



[Locomotive Engine, and part of a train of first-class Carriages.]

We have now traced the steps of this important national work to the time when the engines were prepared, and in a fit state for being applied to useful purposes. The stupendous undertaking was finished in September, 1830, little more than three years having been consumed in the completion of a work in which difficulties of no ordinary kind presented themselves. A brief recapitulation of what was accomplished in the space of thirty-one miles will evince the skill, energy, and perseverance which were brought to the task. Two tunnels were excavated, six considerable eminences cut through, great part of which excavations were hewn out of the solid rock; upwards of three millions of cubic yards of stone, clay and soil, have been dug out of the different excavations. From these materials artificial mounds of great height and extent have been raised through valleys, and semi-fluid matter has been consolidated into strength and consistency. Along the whole line there are sixty-three bridges; under thirty of these the rail-way passes, on twenty-eight it passes over the common road, and on five it is conducted over the waters of the river Irwell, of canals, &c. Twenty-two of the bridges are composed of brick, seventeen of wood and brick, eleven of brick and stone, eleven of wood, and two of stone and wood. The weight of the double lines of rail laid down is 3847 tons, and of the cast iron pedestals on which they are fastened, 1428 tons. There are occasional lines of communication between the rail-ways, and additional side lines at the different depôts.

The total sum expended in effecting this magnificent project, and putting the whole in a situation for active operation, including the cost of constructing warehouses, machinery, and carriages, is estimated at £820,000.

On the 15th of September, 1830, the rail-way was opened by the passage of eight locomotive engines, all built by Messrs. Stephenson and Co. To these were attached twenty-eight carriages of different forms and capacities, capable of containing altogether a company of six hundred persons. Preparations were made on a scale of great magnificence to render this a ceremony of no ordinary kind; and some of the most distinguished characters were invited and attended, to go first over that ground which is now become the scene of daily traffic. The Northumbrian, a steam-engine of fourteen-horse power, took the lead, having in its train three carriages. The performance of the engines was extremely satisfactory until they reached Parkfield, seventeen miles from Liverpool, when they were stopped to renew the feeders and to take in a fresh supply of fuel. Here several of the company alighted from the different carriages; on again starting, that fatal accident happened to Mr. Huskisson, which, after a few hours of extreme agony, terminated his life.

On the following day the Northumbrian left Liverpool with one hundred and thirty passengers, and arrived at Manchester in one hour and fifty minutes. In the evening it returned with twenty-one passengers and three tons of luggage in one hour and forty-eight minutes; and on Friday, the 17th, six carriages commenced running regularly between the two towns, accomplishing the journey usually in much less than two hours. On the 23d of November, 1830, one of the engines went over the distance in the space of one hour, two minutes of which time was taken up in oiling and examining the machinery about midway. No carriages were attached to the engine, and it had only the additional weight of three persons. On the 4th of December following the "Planet" locomotive engine took the first load of merchandise which passed along the rail-way between Liverpool and Manchester. Attached to the engine were eighteen waggons, containing two hundred barrels of flour, thirty-four sacks of malt, sixty-three bags of oatmeal, and a hundred and thirty-five bags and bales of cotton. The gross weight drawn, including the waggons and engine-tender, was about eighty tons. The speed over level ground was at the rate of twelve to fourteen miles per hour. The train was assisted up the Whiston inclined plane by another engine, at the rate of nine miles an hour; it descended the Sutton inclined plane at the rate of sixteen miles and a half an hour; and the average rate of the remaining part was twelve miles and a half an hour. The whole journey was performed in two hours and fifty-four minutes, including three stoppages, of five minutes each, for oiling, watering, and taking in fuel. This was the greatest performance heretofore accomplished by any locomotive power, but it was only the commencement of much greater speed. The Samson engine, on the 25th of February, 1831, started with a train of thirty waggons from Liverpool, the gross weight of the whole being 164½ tons, and with this enormous weight it averaged a speed of twenty miles an hour on level ground. It was assisted up the inclined plane by three other engines, and arrived in Manchester within two hours and thirty-four minutes from first starting; deducting thirteen minutes for stoppages employed in taking in water, &c., the net time of travelling was two hours and twenty-one minutes. The quantity of coke consumed by the engine in this journey was 1376 lbs. being not quite one-third of a pound per ton per mile. By taking the average speed throughout at thirteen miles an hour, the same work would have required seventy good horses.

From the first opening of the rail-way in September to the end of that year, more than 70,000 persons passed by it for various distances between Liverpool and Manchester, without personal injury to a single individual, except one person, who while mounting on the roof of one of the carriages had his leg severely bruised by coming in contact with another vehicle. The security and celerity of this mode of conveyance being thus clearly established, it has become the chief mode of personal communication between the two towns. In the second half year of 1832, however, the conveyance of passengers appears to have materially decreased. This, the directors in the last Report attribute to temporary causes. This Report contains some further interesting details, of which the following is the substance:—

The company carried in the last half year of 1832, 86,842 tons of goods, and 39,940 tons of coal, showing an increase of 7,821 tons of goods, and 10,484 tons of coal, beyond the previous half year. The total number of passengers was 182,823, or 73,498 fewer than were carried in the first six months of 1832.

	£.	s.	d.
The total receipts for the half year were .	80,902	2	10
Total disbursements (including maintenance of way, cost and repair of engines, expenses of establishments, interests on loans, &c.)	48,218	8	10
Leaving a net profit of . . . . . for the half year ending Dec. 31, 1832.	32,623	14	0

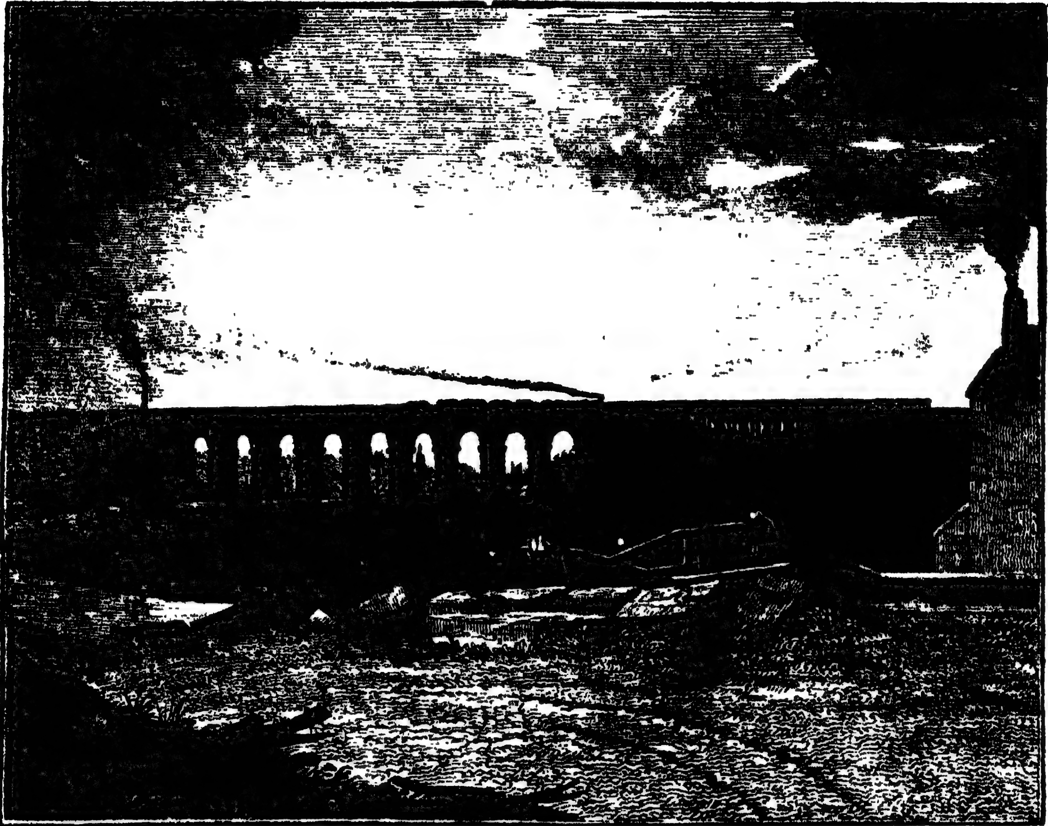
The rate of profit on the transport of each ton of goods and coals appears to have materially increased during the same half year.

A very general opinion has been gaining ground, that the great expense attending the wear and tear of the locomotive engines would render the adoption of some other plan necessary. On this subject the directors admit that in this branch of their expenditure they have met with unexpected discouragement, and with difficulties which they have not yet been able to overcome. The principal items of excessive expenditure in this department have arisen from the frequent renewal of the tubes and fire-places, which, in most of the engines, have been found to burn very rapidly away. To this general result, however, there have been some exceptions; for the company have engines which have run between twenty and thirty thousand miles, with very inconsiderable repairs either to the fire-places or the tubes.

According to the Report, the total amount of capital stock created from the commencement to the 31st December last, whether in shares or by loan, is £1,024,375, every farthing of which has been expended on the works.

The proprietors have divided out of the *net profits* of the concern up to the 30th June, 1832	£112,040 12 6
And the directors are about to recommend a further dividend for the half year ending 31st December last, of .	33,468 15 0
Making a total of realized profits out of the working of the concern, and altogether independent of the capital invested, of	145,509 7 6

being for a period of about two years and a quarter.



[Sankey Viaduct.]

A trip, as it is called, by this extraordinary road for the first time is an event which cannot readily be effaced by the recollections of more common modes of travelling. A pleasurable wonder takes possession of the mind, as we glide along at a speed equal to the gallop of the race-horse. It might be supposed that so great a speed would almost deprive the traveller of breath, and that he could not fail to be unpleasantly conscious of the velocity with which he cut through the air. The reverse is, however, the case; the motion is so uniform, and so entirely free from the shaking occasioned by the inequality or friction of common roads, that the passenger can scarcely credit he is really passing over the ground at such a rapid pace, and it is only when meeting another train, and passing it with instantaneous flight, that he is fully aware of the velocity of his career. The novelty of the scene is delightful: now, where the natural surface of the ground is at the highest, we travel embosomed in deep recesses, and then, where the ordinary course of the road would lead through a valley, we "ride above the tops of the trees," and look down upon the surrounding country. The reflecting traveller probably falls into a pleasing vision arising out of the triumph of human art. He sees the period fast approaching when the remotest parts of his own country shall be brought into easy and rapid communication; and he looks beyond this probable event of a few years, to the more distant day when other nations shall emulate these gigantic works of peace. He sees the evils arising out of the differences of language, and soil, and climate, all vanishing before the desire of mankind for peaceful commercial intercourse; and as he knows that the prejudices and mistaken interests which separate one district of the same nation from another are broken down by such noble inventions as these, he feels that the same spirit of civilization which results from that exercise of our reason, which is bestowed by a beneficent Providence, will eventually render all men as brethren, and children of one great Father.

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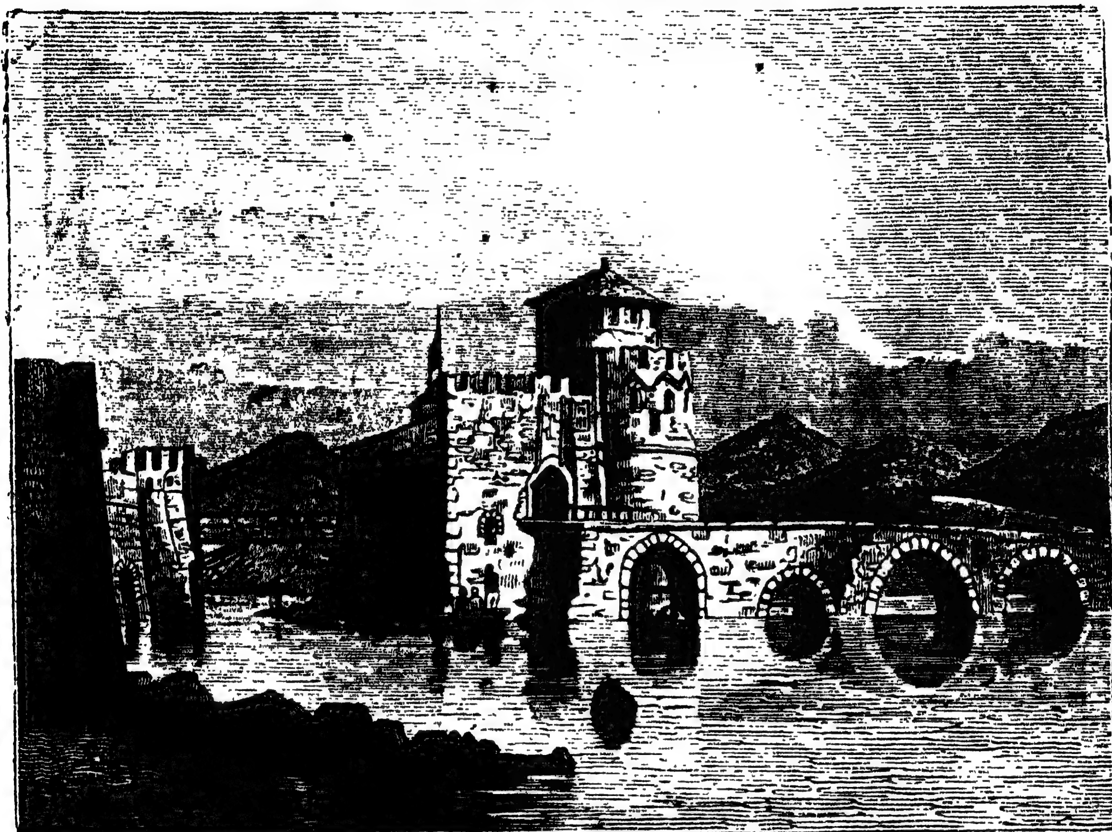
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THE CHANNEL OF THE EURI'PUS AND THE MODERN TOWN OF E'GRIPOS.



[The Bridge of the Euripus.]

Among the less important advantages daily resulting from our more familiar acquaintance with modern Greece, we may mention the additional interest given to many of our earliest historical associations by an exact knowledge of the localities of this country. Ancient history, and indeed all history, can only be rendered intelligible by an accurate knowledge of the relative positions of the places mentioned; and if to this we can add a clear idea of the nature of each remarkable spot, its hills, valleys, rivers, or ruins, the whole narrative assumes quite a different appearance, acquires a ten-fold interest, and fixes itself more firmly in the memory. By a knowledge of the places also we are frequently enabled to detect errors in an historian, or to understand what was before obscure.

The modern town of Egripos is situated on the west side of the island of Eubœa, now commonly called the Negropont, which forms a part of the new kingdom of Greece. Egripos is in N. lat. 38° 26′, E. long. [illegible]° 37′, and stands at the narrowest part of the channel, which separates the island from the main land. This channel is here only forty yards wide. Egripos was formerly a Greek town, under the name of Chalcis; but in modern times once belonged to the Venetians, when that mercantile and warlike state possessed a large part of Greece, with many of the islands, and carried its conquests and its commerce all over the eastern part of the Mediterranean. Egripos is defended on the land side both by a ditch and wall, which latter indeed runs all round it, and shows by the numerous winged lions of St. Mark that the Venetians were the builders. The town is (or, we should perhaps rather say, was) exclusively inhabited by the Turks: the Greeks and Jews dwell in a small suburb to the north of the town and carry on a little trade.

This place, if Greece ever becomes populous and well-cultivated, would probably become the centre of a great trade. It would serve as the place of export for the fertile island of Eubœa itself, which has no port on its iron-bound eastern coast; and it would also furnish an outlet for the produce of the rich plains of Bœotia which lie opposite the town on the west. On each side of the narrow channel it has a port: that on the north, though small, is deep, secure, well adapted for ship-building, and capable of containing many merchantmen. On the south side of the bridge are two ports, of which the one nearer to the bridge is connected with the other further from it by a narrow channel, which, owing to a bank, does not admit vessels drawing more than fourteen feet water. But a small expense, it is supposed, would improve the port of Egripos, so as to allow vessels of three or four hundred tons to pass the narrowest channel, where the water is shallowest.

This channel presents a remarkable phenomenon, which was observed by several ancient writers, and has attracted the attention of some modern travellers. It is, as we have

said, only forty yards wide; and it is further divided into two parts by a rock, on which a fort is built. The passage between the rock and the main land is the wider of the two, but has not more than three feet water. The other passage between the rock and the walls of the town is thirty-three feet wide, and when the water is highest is seven feet deep in the shallowest parts. The Mediterranean, it is well known, like other inland seas, is very little affected with tides, though, undoubtedly, it has tides to some extent; and these, from the configuration of the coasts, may be felt more in some parts than others. This deeper channel, however, presents most extraordinary and irregular tides or currents, which, though found by observation to depend in some degree like other tides on the moon's attraction, are not reducible to a regular system. Sometimes the water will run as much as eight miles an hour, with a fall of about one foot and a half under the bridge. It is seldom at rest, changes its direction in a few minutes, and will at once resume its usual velocity of four or five miles an hour in either direction, as it may happen to run. The greatest rapidity is always to the south.

The *immediate* cause of this phenomenon must be the continued variation of the relative level of the waters on the north and south side of the channel, which is not wide enough to allow such a free communication as would ensure either a constant level, or a constant current in one direction. But what cause this perpetually varying level is owing to, or to what combination of causes, is difficult to say. The changing winds, particularly those from the N.E., may be one cause. The current from the Dardanelles sets fairly on the east side of the island, and it is therefore supposed can have no effect on the stream of the Euripus, though this appears by no means certain.

Aristotle, it is said, laboured in vain to find out the cause of this phenomenon, and according to some accounts, for the truth of which we do not vouch, drowned himself out of vengeance at being thus foiled. However this may be, this great man died at Chalcis.

On the main land, a little further south than Egripos, and near the water, are some remains of those walls, composed of large stones, commonly called Cyclopean, which, it is supposed, mark the site of Aulis, where Agamemnon assembled his fleet previous to the expedition to Troy. No place could have been so well suited as a central position for the various dependants of the great monarch of Mycenæ, and the port is amply large enough to hold the thousand ships that went to the war against king Priam.

When the mighty armament of the Persians, under Xerxes (B.C. 480), came against European Greece, the Asiatic navy was stationed for some time at the entrance of the gulf of Volo, opposite the north end of Eubœa, where several engagements took place. A part of the Persian squadron which was sent round the island was wrecked during a storm on the eastern coast, which is even now much dreaded by mariners, as it offers no port at all during the strong N.E. winds which increase the violence with which the Dardanelles current sets upon it. The main part of the Persian navy followed the Greeks through the narrow channel opposite Egripos, from which fact we can form some idea of the size of the largest vessels used at that time. At least we know that none of them could draw more than seven feet of water, and the greater part of them probably drew much less. (See Herodotus, viii. 66.)

PETER THE WILD BOY; AND THE SAVAGE OF AVEYRON.

There are several well-authenticated cases on record of children having been found in solitary places, leading a brutish life, incapable of communicating ideas by language, and apparently completely ignorant of all the social usages of mankind. These remarkable instances exhibit how degraded and miserable is the condition of a human being, when its mind has been unformed by the example of others, and no moral or intellectual training has been bestowed upon it. The two most striking examples of this unhappy state are those furnished by the individuals known by the names of Peter the Wild Boy, and the Savage of Aveyron. They were probably idiots from their birth; but their mental defects were greatly increased by their wild life;—for education did something for the mitigation of their calamity.

In the month of July, 1724, Jurgen Meyer, a townsman of Hameln, found in his field a naked, brownish, black-haired boy, apparently about twelve years old, who uttered no sound. He was enticed, upon two apples being shown to him, into the town; and placed, for safe custody, in a hospital, by order of the burgomaster. Peter - for he was so called by the children on his first appearance in the town, and he went by this name to his death—behaved himself in rather a brutish fashion at first; seeking to get out of doors and windows, resting on his knees and elbows, and rolling himself from side to side till he fell asleep. He did not like bread, but he eagerly peeled green sticks, and chewed the peel for juice, as he also did vegetables, grass, and bean-shells. He soon learned to conduct himself more properly, and was allowed to go about the town. When any thing was offered him to eat, he first smelt it, and then put it in his mouth, or laid it aside, shaking his head. In the same way, he would smell people's hands, and then strike his breast, if pleased, or, if otherwise, shake his head. When he particularly liked any thing, as beans, peas, mulberries, fruit, and especially onions and nuts, he indicated his satisfaction by repeatedly striking his chest.

When shoes were first given to him, he could not walk in them, and appeared happy in getting rid of them, and running about bare-footed. Covering the head was equally unpleasant to him; and he enjoyed greatly throwing his hat or cap into the Weser, and seeing it swim down the river; but he soon became accustomed to clothing. His hearing and smell were acute.

In October, 1725, he was sent for by George I. to Hanover, whence he was escorted to London in the beginning of the following year by a king's messenger; and subsequently committed to the care of Dr Arbuthnot. When he was first met with, a small fragment of a shirt hung about his neck; and the whiteness of his thighs, compared with his brown legs, proved that he must have worn breeches, but not stockings. His tongue was very large, and little capable of motion; so that an army surgeon at Hameln thought to set it free by cutting the frænum; but did not perform the operation. Further, some boatmen, in descending the Weser, had seen at different points on the banks of the river, a poor naked boy, and had given him something to eat; and lastly, it was ascertained that a widower at Luchtringer had had a dumb child; who, having been lost in the woods in 1723, returned home again; but, on his father's second marriage, was driven out again by his step-mother. After remaining some time under the care of Dr. Arbuthnot, it was found that he was incapable of improvement—that he was, in fact, an idiot; he was afterwards placed with a farmer in Hertfordshire, with whom he resided till his death in 1785.

Peter was of middle size, somewhat robust in appearance, and strong, and had a good beard. He took the ordinary diet, retaining, however, a great fondness for onions. He was fond of warmth and relished a glass of brandy.

He could not be taught to speak; the plainest of the few articulate sounds he could utter were *Peter*, *ki sho*, and *qui ca*; the two latter being attempts at pronouncing King George and Queen Caroline. He had a taste for music, and would hum over various airs that he often

heard; when an instrumental performance took place, he would jump about with great delight till he was quite tired. He was never seen to laugh.

Peter was harmless and docile, could be employed with safety about the house, or in the fields if superintended. Having been left to himself to throw up a load of dung into a cart, as soon as he had executed the task, he jumped up, and set to work as diligently to throw it all out again. Having on one occasion wandered away from home as far as Norfolk, at the time when great alarm existed about the Pretender and his emissaries, he was brought before a justice of peace as a suspicious character; and making no answer to any interrogatories, was deemed contumacious, and sent to prison. A fire broke out in the night, when he was found sitting quietly in a corner, enjoying the light and warmth very much, and not at all frightened. Such is the history of Peter the Wild Boy. We proceed to that of the Savage of Aveyron.

A child about eleven or twelve years old, who had been seen some years before in the forest of Cawne quite naked, and seeking acorns and roots for food, was met near the same spot, in the year 1801, by three huntsmen who laid hold of him at the moment when he was climbing up a tree to avoid his pursuers. He was taken to a village in the neighbourhood, and put under the care of a woman; but he made his escape a week after, and reached the mountains, where he wandered about during a severe winter, with nothing but a tattered shirt to cover him, retreating at night-fall into solitary places, and approaching the neighbouring villages in the day. He continued to lead this savage life until he entered one day an inhabited house in the canton of St. Servin. He was retaken, watched and attended to for several days, and thence conveyed, first to the hospital of St. Afrique, and subsequently to Rhodiz, where he was kept for some months. During his stay at these places, he was at all times equally wild, impatient, and restless, constantly endeavouring to make his escape. His actions furnished occasion to observations of the most interesting nature.

The attention of the minister of the parish was attracted by this extraordinary circumstance, and the young savage of Aveyron was brought, by order of the government, towards the close of the year 1802, to the capital. Great curiosity and expectation were excited in Paris. The impression which so many new and surprising objects would make on the unsophisticated mind of the savage, the degree in which he might be susceptible of education, and the light which the progress of his intellectual development might throw on the philosophy of the human mind,—these topics afforded matter for interesting speculation. But this interest was much abated when the young savage was found to be a disgustingly dirty child, affected with spasmodic or convulsive twitches, constantly balancing himself backwards and forwards, like certain animals in a menagerie, biting and scratching all who offended him, and showing no affection towards those who were kind to him; indifferent to every thing, and apparently incapable of fixing his attention upon any one object.

After some time he was put under the care of Dr. Itard, Physician to the Institution for the Deaf and Dumb at Paris, who published * an account of the plan adopted for rescuing this unfortunate being from the state of physical and moral degradation to which he was, according to all appearances, irremediably consigned. A report made by Dr. Pinel, after a minute examination of the condition of the savage, was sufficiently discouraging. The eyes of the boy wandered from one object to another, and were wholly destitute of expression. The sense of touch was so defective that he could not distinguish an elevated surface from a painting; he was insensible to all sounds, whether loud or soft; he could only make a low guttural noise; he seemed equally indifferent to the richest perfumes, and the most fetid exhalations; and was incapable of using his hands for any other purpose than the mere mechanical one of prehension. The state of his intellectual functions corresponded with that of his sensitive system. Cut off from the ordinary means of communication with his fellow-beings, he was destitute of memory, judgment, and all imitative power; his gestures and notions were purely mechanical, and he would pass, without any assignable motive, from a state of stupid melancholy to extravagant bursts of laughter; he was incapable of attachment, had not the slightest moral perception, and seemed to take pleasure in nothing but the gratification of his organs of taste. In short, his existence was merely animal, and he could not be compared, in point of intelligence, with many of the animals which, with reference to their organization, we must call inferior. Dr. Pinel was of opinion that his case was one of incurable idiocy; but Dr. Itard, while he admitted the truth of this deplorable picture in all its details, still entertained hopes, considering that the probable cause of this individual's physical and moral degradation was his want of all education, and his complete separation from all individuals of his own species.

To attach him to social life by means of kindness and attention to his comforts,—to extend the sphere of his ideas by the application of powerful stimuli, moral as well as physical, by creating for him new wants, and multiplying his relations with surrounding objects,—to lead him, if possible, to the use of speech, and gradually to the exercise of the understanding, by directing, in the first instance, the simplest operations of the mind to objects connected with his physical wants—these were the views by which Dr. Itard was governed in prosecuting what at first appeared to be a hopeless undertaking and his efforts were so far successful, that, at the end of nine months, a very decided improvement was effected in the physical and intellectual condition of the unfortunate object of his benevolent attentions. In fact, at the end of this time his appearance and demeanour did not materially differ from those of an ordinary child, deprived of the use of speech; an improvement, he observed, which to those who saw him in his wild and apparently irreclaimable state must have seemed incredible.

The cases of Peter the Wild Boy, and the Savage of Aveyron, were most probably cases of defective organization. In other instances, where the faculty of speech was ultimately developed, we have only to make allowances for exaggeration in the accounts given of the early habits of these so-called wild individuals, and there is nothing in their history which the circumstances under which they were found will not easily account for. Language is acquired by imitation, and there is nothing extraordinary, therefore, in the circumstance of individuals, cut off from intercourse with society, but free from any organic defect, having been found for a time incapable of uttering articulate sounds. As to the accounts of human beings going on all fours, or of inferior animals habitually maintaining the erect attitude, anatomy furnishes the best answer to these misrepresentations. The great length and power of the lower limbs in man, which admirably qualify him for the erect position, render him altogether unfit for going on all fours. On the other hand, in the quadrumanous animals (such as monkeys) the lower extremities are comparatively weak and slender; and they always have the knees half bent, in consequence of the peculiar formation of the thigh bone, and the position of the muscles which bend the leg. The forest is the natural domicile of these animals; and when necessity or inclination brings them to the ground, from the trees to which they chiefly confine themselves, their motion is, for the most part, that of quadrupeds.

* Itard de l'Education d'un Homme Sauvage.



[St. Peter curing the Lame.]

CARTOONS OF RAFFAELLE.—No. 5.

ST. PETER CURING THE CRIPPLE.

BEYOND all painters Raffaelle claims the praise of never repeating his own ideas. In considering the multiplicity of his compositions we are astonished at the extent of his invention. The subject engraved in the present number, St. Peter curing the Cripple, is precisely similar to that of the cartoon which preceded it. In the scriptural narrative of the two miracles there are few points of difference; yet among all Raffaelle's works no two subjects can be found more completely and entirely dissimilar. This diversity has been obtained chiefly by selecting from one narrative, the Sacrifice at Lystra, a point of time subsequent to the performance of the miracle,—from the other, the moment immediately preceding it. The subject of the cartoon before us, St. Peter healing a Cripple, or, as it is sometimes called, the Beautiful Gate, is less diversified with action and incidents than that of Paul and Barnabas; but the scene in which the event takes place is filled with such a range of character and picturesque accompaniments, as to render it one of the most striking and effective of all the cartoons.

The Apostles Peter and John were entering the temple at Jerusalem by the "gate which was called beautiful;" the cripple, who was brought there daily, and had been lame from his birth, solicited alms as they passed.—"Then Peter said, Silver and gold have I none, but such as I have, I give unto thee: in the name of Jesus Christ of Nazareth, rise up and walk! And he took him by the right hand, and lifted him up, and immediately his feet and ankle-bones received strength; and he, leaping up, stood and walked, and entered with them into the temple, walking and leaping, and praising God."

We may conclude, as the epithet "beautiful" was applied to the vestibule in which this event took place, that it was remarkable for architectural magnificence. Raffaelle, accordingly, has selected an order of columns of the most ornate splendour; spiral, and embellished with arabesques in bas-relief. These pillars are ranged four deep, a plan which gives fulness and richness of effect, and at the same time leaves depth and space, and a sufficient atmosphere for the figures to move and breathe freely in,—a point which even in his most crowded compositions Raffaelle is always careful to secure. The Apostles Peter and John occupy the middle compartment, that, of course, which fronts the eye of the spectator; and before them is the cripple, whose hand the Apostle has taken. The action of St. Peter is simple and dignified; it exhibits, however, nothing of the lofty demeanour which may be supposed to characterize power merely human; neither is there in it a trace of doubt, nor of the anxiety and eager interest which may be felt by a physician while watching the progress of an extraordinary cure. St. Peter is fully conscious that he wields infallible power, but that he holds it as the organ of Omnipotence. St. John regards the cripple with an air of the most mild and gracious benevolence. Expression is dispersed and discriminated among the surrounding figures with Raffaelle's usual variety and power. Curiosity, faith, and scepticism are all manifested. The old man who leans on crutches, and presses forward from behind the column, evinces the most absolute belief in the divine power vested in the Apostles, and seems to implore its exercise in his own behalf: the soldier on the extreme right participates in this confidence; while the countenance of the man next him, who lays his finger on his lip, bears the strongest indications of scorn and incredulity. An amiable mother diversifies this group; her attention is absorbed by her infant, and she gives but a casual glance at the transactions which are passing round her; her beautiful head and that of the infant are admirably contrasted by the personification of sturdy deformity exhibited in the cripple who is placed before her; he regards the Apostles eagerly; half jealous, apparently, of whatever assistance is about to be bestowed on his fellow, and impatient to [partake] in it.

The figures on the extreme left occupy the outer portico, and are not, consequently, within range of the principal action. The group of the young woman who carries a basket on her head, and leads a boy bearing doves, is one of the loveliest creations in art. The bright open sky, seen between the interstices of the columns, harmonizes with the lightness, cheerfulness, and happy expression of those figures. In the compartment where the miracle is taking place there is a similar correspondence of effect with sentiment. The subdued light of lamps burning in the depths of the recess accords well with the reverential feeling excited by the sacred transaction.

The Lancasterian System in Greece, A.D. 1669.—We found about thirty young lads sitting upon benches, and their master at the head of them teaching them to read. His method was pretty, and much beyond ours; the master causing the whole class to read at a time without confusion, every scholar being obliged to attention, and to mind what his next neighbour reads. They had, each of them, the same author in his hand; and, for example, if he had thirty scholars he chose out some continued discourse, and gave them but thirty words to read; the first boy reading the first word, the second boy the second word, the third boy the third, and so on. If they read soundly and right, he gave them thirty words more: but if any of the boys were out or imperfect, he was corrected by the next, who was always very exact in observing him, and he his neighbour, till the whole number of words were read. So that the thirty scholars, lying all of them at catch, and ready to take advantage of any defect in their neighbour, stimulated by an ambition of being thought the best scholar, every one's lesson was the lesson of all, and happy was he that could say it the best. To obviate any of the scholars in eluding that order by preparing himself for any single words, their places were changed, and he who was at one reading in the first place was removed a greater distance in the next. Thus one lesson was enough for a whole form, how numerous soever, and which was very convenient for the master: the boys were not constrained to come to him one after another, for every one was a master to his neighbour.—*Guillatière, quoted in Hennen's Medical Topography of the Mediterranean.*

Plum-Pudding.—The following is the account of the method of making plum-pudding in England given by the Chevalier d'Arvieux in 1658: "Their pudding was detestable. It is a compound of scraped biscuit, or flour, suet, currants, salt, and pepper, which are made into a paste, wrapped in a cloth, and boiled in a pot of broth; it is then taken out of the cloth, and put in a plate, and some old cheese is grated over it, which gives it an unbearable smell. Leaving out the cheese, the thing itself is not so very bad."

The Violet.—Although this favourite little flower has given its name to one of the primitive colours, we must not imagine that the violet is always of a violet hue; it is often blue, purple, lilac, or white. The *viola tricolor* indeed is partly yellow, but then in common life this is called a heart's-ease; botanically speaking, however, it is a violet. The flowers were formerly considered pectoral; *i. e.* useful in diseases of the chest; but the supposed virtues of the whole class of pectoral medicines have vanished before the severe medical criticism of the last fifty years; and at the present day the petals of the violet are never prescribed by educated practitioners. The root of the violet, however, is an emetic, and may be useful as a domestic remedy in country practice. The dose is forty grains. The infusion of violets is one of the most delicate tests of the presence of acids and alkalies; the former changes its colour to red, the latter to green. According to Lightfoot, the Highland ladies of former times used the violet as a cosmetic, the old Gaelic receipt being "Anoint thy face with goats' milk in which violets have been infused, and there is not a young prince upon earth who will not be charmed with thy beauty."

ON EDUCATION.

"It is our fashion," says Plutarch, "to discuss and to doubt whether discretion, and virtuous habits, and upright living are things that can be *taught;* and then we wonder that skilful orators, good navigators, architects, and farmers are in plenty; but *good men* are things known only by report, and are as rare as Centaurs, Giants, and Cyclops." And further, he says, "We learn to play on musical instruments, and to dance, and to read, to farm, to ride the horse; we learn how to put on our clothes, and our shoes; we are taught how to pour out wine, how to prepare food; and all these are things that, without some instruction, we cannot do well. But the object for which all this is done, *to live a good and happy life*, remains untaught, is without the direction of reason and art, and is left altogether to chance."

The complaint which the Greek moralist made so many centuries ago may be repeated at the present day. We learn, at least the richer part of us, to dance, and to sing—both very good things in their way; we learn languages, living and dead, and rather more of the latter than the former; we learn arts and sciences, which tend to improve the mental faculties, and extend our views of the physical world, and the laws that regulate its existence. We learn also to name all the virtues and vices; and we are taught that the virtues are to be practised, and the vices to be shunned. But are we taught when young to acquire those *habits*, without which the knowledge of a rule of conduct is practically inefficient? Are we so trained at home and at school as habitually to *practise* those virtues which are inculcated under the most solemn sanctions? This is a branch of education still very imperfect; but when the time comes, as we trust it soon will, when universal education will form the basis of our social system, it will be necessary to consider, if, with the *knowledge* of moral truth, the *practice* of it also cannot be acquired. When we consider what a great number of things all the world agrees ought *not* to be done, and how many all the world agrees *ought* to be done, the disproportion between the knowledge of what is right, and the practice of it, is not a little striking. Persons of the most vicious habits are often ready to acknowledge that they know their practices to be bad; but the force of custom is superior to the knowledge of right. It cannot be said, in all cases, that men know one course of conduct to be right, and yet pursue a contrary course, because some present gratification misleads them: men often do that which is positively and immediately injurious to themselves. Under the influence of violent passions, a man often commits an act, which must be considered rather as a consequence of a temporary deprivation of the reasoning faculty, than as a momentary indulgence. That the part of education, which has for its object the formation of good *habits*, is still very defective in *all* classes of society, is a fact that cannot be denied. In the richest classes it is perhaps the most defective; though, as the richest are but a small part of the community, their vices less affect the general welfare.

It would seem at the present day a matter of the highest importance, in a country like this, where so many people depend for their living on the daily labour of their hands, to train up every child of the working classes in habits of cleanliness, regularity, the *practice* of truth, of self-control, and a knowledge that on himself depends *mainly* his happiness or his misery; that all the exertions of the benevolent to better his condition, and all the indifference of the selfish to his sufferings, have comparatively little permanent influence on the condition of the great mass of society. But still, in the present state of affairs, the poor should be helped a step forward, by their richer neighbours contributing the chief part towards the establishment of proper schools for their children. It is perhaps an advantage, that hitherto no decisive measures have been taken for a general system of education; for we believe we are much more likely to see something really useful established *now*, than if any plan proposed a dozen or twenty years ago had been adopted, and had taken root.

The question which Plutarch says was debateable in his time, may perhaps by some be considered so still, but it is worth while making the experiment; and since precept alone is found to be inefficient, let us see whether the *practice* of good habits cannot be acquired more extensively than it is, by an appropriate system of discipline. In every well regulated school, no doubt much good is done by the habits of regularity which are required, by the religious and moral precepts that are inculcated, and by the *example* of the teachers, and their communication with the pupil, out of the hours of regular instruction. But the radical evil that prevails in most schools for the middle classes, is the abuse of the system of competition or emulation, the excess of which, so far from being necessary to produce even intellectual excellence, is, we believe, in the long run unfavourable to it. The art of teaching, in its widest sense, consists in making the thing taught agreeable; if a thing does not give pleasure, it is rare to find any instance of excellence being attained in it, even under the competitive plan. The short, and often violent efforts, made under the system of emulation, tend to destroy all real love for what is morally and intellectually good. "When the Lacedemonian teacher," says Plutarch, "was asked what he did in his profession: 'I make boys,' said he, 'like that which is good.'"

THE PEARL FISHERY OF CEYLON.

As there exist many popular errors on this very interesting subject, we will endeavour to give an account of the fishery from materials which we have derived from the most authentic sources. Foremost among these we must place a recent work * by the Count de Noé, now a peer of France, but formerly one of the French emigrants, and an officer in the British army, in which latter capacity he went to India. This gentleman was for a considerable time stationed, with part of the regiment to which he belonged, at the very spots where the pearl fishery was carried on. He had thus ample means of observation; and, according to the testimony of those who have enjoyed the same advantages at the same places, the information M. de Noé gives is extremely correct.

The pearl oysters, like our common oysters, lie in banks, at greater or less depths in the sea. These banks occur on the western side of the island of Ceylon, about fifteen miles from the shore †, where their average depth is about twelve fathoms, and here the greatest of all pearl fisheries has been carried on for many centuries. They seem always to have been considered as the property of the King or Kings of Ceylon; the Dutch monopolized them during their power; and since the occupation of the island by the British, our government has continued to sell by auction the privilege of fishing on them. These sales ‡ are only made for one season.

The fishery always begins in the month of April, because in those latitudes the sea is then at its calmest state, and it is generally continued until the middle or

* 'Mémoires relatifs à l'Expedition Anglaise de l'Inde en Egypte.'

† Off Aripo, Chilow, and Condatchy.

‡ Of late years a single auction sale of the whole fishery has been made to one individual, a great speculator, who afterwards sells shares of the banks to others. The biddings at the auction are regulated by the examination of some thousands of oysters picked previously from the banks, at hazard. If the average quality of pearls produced from these sample oysters is very good, the bidder raises his offer; if bad, he lowers it.

end of May. It not only attracts a multitude of Cingalese, or natives of the island, to the coast, but crowds of speculators from all parts of the vast Indian peninsula, whose variety of language, manners, and dress, is described as being very striking and pleasing. The temporary abodes erected by them, or for them, are also curious and picturesque. On a solitary sea-shore a mass of almost innumerable huts is at once seen to arise on the eve of the fishery. These huts are merely composed of a few poles stuck in the ground, interwoven with light bamboos, and covered with the leaves of the cocoa-nut tree; "yet," says M. de Noé, "these ephemeral habitations often shelter as many as one hundred and fifty thousand persons."

The signal for beginning the fishery is given at day-break by the discharge of a cannon, on which a countless fleet of boats, that have started from the shore at midnight, and favoured by a land-breeze have reached the banks before dawn, cast anchor in the respective parts of the banks for which their owners have contracted, and proceed to work. Government vessels are on the spot to prevent any boat from fishing beyond its proper limits. The boats of the pearl fishers generally carry a captain, a pilot, and twenty men, ten of whom are experienced divers. The ten divers are divided into two companies of five each, and these companies plunge and relieve each other by turns.

In order that they may descend through the water with greater rapidity to the base of the bank round which the oysters are clustered, the divers place their feet on a stone attached to the end of a rope, the other end of which is made fast to the boat. They carry with them another rope, the extremity of which is held by two men in the boat, whilst to the lower part, that descends with the diver, there is fastened a net or basket. Besides these, every diver is furnished with a strong knife to detach the oysters, or serve him as a defensive weapon in case he should be attacked by a shark. As soon as they touch ground they gather the oysters with all possible speed, and having filled their net or basket, they quit their hold of the rope with the stone, pull that which is held by the sailors in the boat, and rapidly ascend to the surface of the sea.

The marvellous stories that are told of the length of time that these divers can remain under water have no foundation in truth. The intelligent Mr. Henry Marshall* informs us, that in the whole course of his experience he rarely knew the submersion of one of them last longer than fifty seconds. This is about the time that we have seen the men in the bay of Naples, who dive for *frutta di mare*, or small shell-fish, and the Greek islanders of the Archipelago, who dive for sponges, remain under water; and these two classes are the most famous divers in Europe, and likely, from their physical construction, sober way of living, and constant practice, to carry their art to its utmost natural limits. Ribeyro, a Portuguese officer, who was nineteen years on the island, says, that the Ceylon plunger could stay under water for the space of time in which two *credos* might be repeated, and the Catholic belief may be said over twice in about fifty seconds.

Although sharks are numerous in the seas round Ceylon, accidents rarely happen. This may be attributed to the noise and stir occasioned by the gathering of so many boats on one spot, and the continual plunging of the divers, which must frighten and disperse the voracious animals; but the superstitious Cingalese rather attribute their safety to certain charms they buy from old women, who pretend they can bewitch the sharks, and prevent them from attacking their customers. Instances have however occurred, when neither the natural noise kept up by the boats, nor the supernatural protection, has deterred the shark; and the diver, by means of his knife, and great dexterity, has killed the monster, and escaped unhurt.

Alternately plunging and reposing, the divers continue their occupation until about ten o'clock in the forenoon, when the sea-breeze begins to blow, and one of the government vessels fires a gun, as a signal for the whole flotilla to return to shore. As soon as the boats touch the beach, an immense number of labourers, men, women, and children, rush to them, and carry off the produce of the day's fishing. Every speculator has his own group of huts, and in the midst of each of these is a *couttô*, or space of ground enclosed with poles and transverse pieces of bamboo, but open to the air. In these *couttôs* are deposited the oysters as they are landed, and there they are left to putrefy, which they soon do under a burning sun. It is a curious fact, that though these numerous *couttôs*, each containing an enormous mass of oysters, all putrefy together on a narrow extent of soil, and emit the most detestable odours, yet the health of the precarious but crowded population gathered there is in no ways affected. "During two consecutive years," says M. de Noé, "that I did duty at the fishery, I never saw a soldier of my regiment sick: Europeans and Sepoys all equally enjoyed good health." And Mr. Marshall has observed to us, that in this climate, where the effects of vegetable decomposition are so fatal and so rapid, those of animal decomposition are almost innocuous.

As soon as the putrefaction is sufficiently advanced the oysters are taken from the *couttô*, and placed in troughs, made of the trunk of trees, hollowed; sea-water is then thrown over them. In their putrid state the oysters easily render the pearls they contain; and a number of men, all standing on the same side of the trough, rapidly shake them out and wash them. Inspectors stand at each end of the trough to see that the labourers secrete none of the pearls, and others are in the rear to examine whether the shells thrown out as worthless may not contain some of the precious substance. The workmen are prohibited under penalty of a beating to lift their hands to their mouths while they are washing the pearls. Notwithstanding these precautions and the vigilance of the inspectors, a man sometimes contrives to swallow a pearl of high price. After all the shells are thrown out, the pearls they may have contained remain on the sand at the bottom of the trough. The largest of these pearls are carefully picked up and washed repeatedly with clean water; the next in size and quality are merely taken from the trough and spread out on white napkins to dry in the sun: it is not till this is done that any attention is paid to the smallest pearls which are generally left to the care of women who pick them up and dry them. To assort the pearls afterwards they make use of three sieves placed one above the other. The apertures in the uppermost sieve are the largest, and the apertures of the second sieve larger than those of the third sieve. Thus the pearls that do not pass through but remain in the first sieve are of the first class, and so on to the second and third. It remains, however, for an after examination to decide on other qualities which give value to the pearls, as their regularity of form, colour, &c. And here it is worth while to remark, that whilst in Europe we most esteem the pearls which are purely white, the people of the island prefer those which are rose-coloured, and the Indians and other orientals, those which are yellow. Besides these three colours, pearls are found of a delicate blue tint, and some have a golden and some a silvery hue.

"The pearl," says M. de Noé, "is a malady of the oyster, which requires seven years to develope itself completely. If the shell is not fished at that time, the animal dies, or the pearl is lost. When the season

* This gentleman is Deputy Inspector of Army Hospitals, and was for many years surgeon to the forces at Ceylon, on the medical topography of which island he has written some very valuable notes.

happens to be stormy the oysters often suffer, and their produce is consequently diminished. Perhaps in those occasions they open and disgorge their pearls. The pearl-oyster is the same size as our own, but oval in shape, and quite flat on one side. The testaceous fish enclosed in the shell has a beard like the muscle."

At the time of this fishery at Ceylon, besides the numerous speculators that come from India, there annually arrive troops of Indian artizans who are very expert in piercing or drilling the pearls, and who practise their art on the spot for very moderate wages. These men sit in the open air before the hut of the fisher or speculator by whom they may be employed. Nothing can well be more simple than the implements they use. These are merely a block of wood in the form of an inverted cone which rests on three legs, and whose upper surface is pierced with circular holes of various diameter fitted to receive the variously sized pearls. Their drill is merely a short, sharp needle, inserted in a stick, which is made circular at the top, and set in motion by a bow like those used by our watch-makers, &c. They hold the right hand between the bow and the pearl, and move the bow with the left hand. Sitting on the ground cross-legged, they keep the block of wood between their knees, and apply the drill perpendicularly to the pearl, which they are said to pierce with extraordinary rapidity and correctness.

During the prosecution of the fishery, few places can be more animated than the western point of Ceylon. The oysters or the cleansed pearls are bought and sold on the spot, and besides this trade the confluence of so many crowds from different countries attracts dealers in all sorts of merchandize. The long line of huts is a continuous bazaar, and all is life and activity. But, the fishery over, both natives and strangers depart, the huts are knocked down, scarcely a human habitation can be seen for miles, and the most dreary solitude prevails until the next year.

MORNING HYMN.

Sleep, forsake us! may the soul
Gladden in its Maker's sight,
As the clouds that o'er us roll
Sparkle in the morning light.

God of life, be Thou the ray
Of our dim and wandering course;
Light us, as the star of day,
On to Truth's eternal source.

Military Surgeons in the Sixteenth Century.—I remember when I was in the wars at Muttrel, in the time of that most famous prince, King Henry VIII., there was a great rabblement there, that took upon them to be surgeons. Some were sow-gelders and horse-gelders, with tinkers and cobblers. This noble sect did such great cures, that they got themselves a perpetual name, for like as Thessalus's sect were called Thessalians, so was this rabblement, for their notorious cures, called dog-leeches; for in two dressings they did commonly make their cures whole and sound for ever, so that they neither felt heat nor cold, nor no manner of pain after. But when the Duke of Norfolk, who was their general, understood how the people did die, and that of small wounds, he sent for me, and certain other surgeons, commanding us to make search how these men came to their death, whether it were by the grievousness of their wounds, or by the lack of knowledge of the surgeons; and we, according to our commandment, made search through all the camp, and found many of the same good fellows, which took upon them the names of surgeons,—not only the names, but the wages also. We asking of them whether they were surgeons or no; they said they were. We demanded with whom they were brought up; and they, with shameless faces, would answer, either with one cunning man or another who was dead. Then we demanded of them what chirurgery stuff they had to cure men withal; and they would show us a pot or box, which they had in a budget, wherein was such trumpery as they did use to grease horses' heels, and laid upon scabbed horses' backs; and others that were cobblers and tinkers, they used shoemakers' wax, with the rust of old pans, and made therewithal a noble salve, as they did term it. But in the end this worthy rabblement was committed to the Marshalsea, and threatened by the Duke's Grace to be hanged for their worthy deeds, except they would declare the truth what they were, and of what occupation; and in the end they did confess, as I have declared to you before.—*Thomas Gale, quoted in Ballingall's Military Surgery.*

Minerals in Vegetables.—In many parts of the East there has long been a medicine in high repute, called *Tabasheer,* obtained from a substance found in the hollow stem of the bamboo cane; some of this was brought to England about twenty years ago, and underwent a chemical investigation, and proved to be an earthy substance, principally of a flinty nature; this substance is also sometimes found in the bamboo grown in England. In the hot-house of Dr. Pitcairn, at Islington, subsequent to this time, there was found in one of the joints of a bamboo which grew there, on cutting it, a solid pebble about the size of a pea. The pebble was of an irregular rounded form, of a dark brown or black colour; internally it was reddish brown, of a close dull texture, much like some martial siliceous stones. In one corner there were shining particles which appeared to be crystals, but too minute to be distinguished even with a microscope. This substance was so hard as to cut glass. The cuticle, or exterior covering of straw, has also a portion of flinty matter in its composition, from which circumstance, when burnt, it makes an exquisitely fine powder for giving the last polish to marble, a use to which it has been applied time immemorial, without the principle being philosophically known. In the great heat in the East Indies, it is not uncommon for large tracts of reeds to be set on fire, in their motion by the wind, as I am told by Captain N——, which I conjecture must arise from the flinty surface of their leaves rubbing against each other in their agitation. These facts cannot avoid presenting to the mind, at one view, the boundless laws of nature; while a simple vegetable is secreting the most volatile and evanescent perfumes, it also secretes a substance which is an ingredient in the primeval mountains of the globe.

[From 'Elements of the Science of Botany as established by Linnæus,' an entertaining and instructive work.—Martial, in the above extract, means containing iron, and siliceous means flinty.]

Abstraction from ourselves recommended.—Men are apt to grow, in the apostolic phrase, too "worldly:" the propensity of our nature, or rather the operation of our state, is to plunge us, the lower orders of the community, in the concerns of the day, and our masters, in the cares of wealth and gain. It is good for us sometimes to be "in the mount." Those things are to be cherished which tend to elevate us above our ordinary sphere, and to abstract us from our common and every-day concerns. The affectionate recollection and admiration of the dead will act gently upon our spirits, and fill us with a composed seriousness, favourable to the best and most honourable contemplations.—*Godwin's Essay on Sepulchres.*

Black Teeth.—The teeth of the Tonquinese (like those of the Siamese*) are as black as art can make them: the dyeing occupies three or four days, and is done to both boys and girls when they are about twelve or fourteen years old; during the whole operation they never take any nourishment, except of the liquid kind, for fear of being poisoned by the pigment if they swallowed what required mastication. Every person, high and low, rich and poor, is obliged to undergo this severe operation, *alleging it would be a disgrace to human nature to have teeth white as those of dogs or elephants.*

Prior mentions this custom, but transfers it to the Chinese.

"In China none hold women sweet,
Unless their snags are black as jet:
King Chihu put nine queens to death,
Convict on statute iv'ry teeth."

Tennant's Outlines of the Globe.

* The countries of both these people are in the immediate neighbourhood of China.

. The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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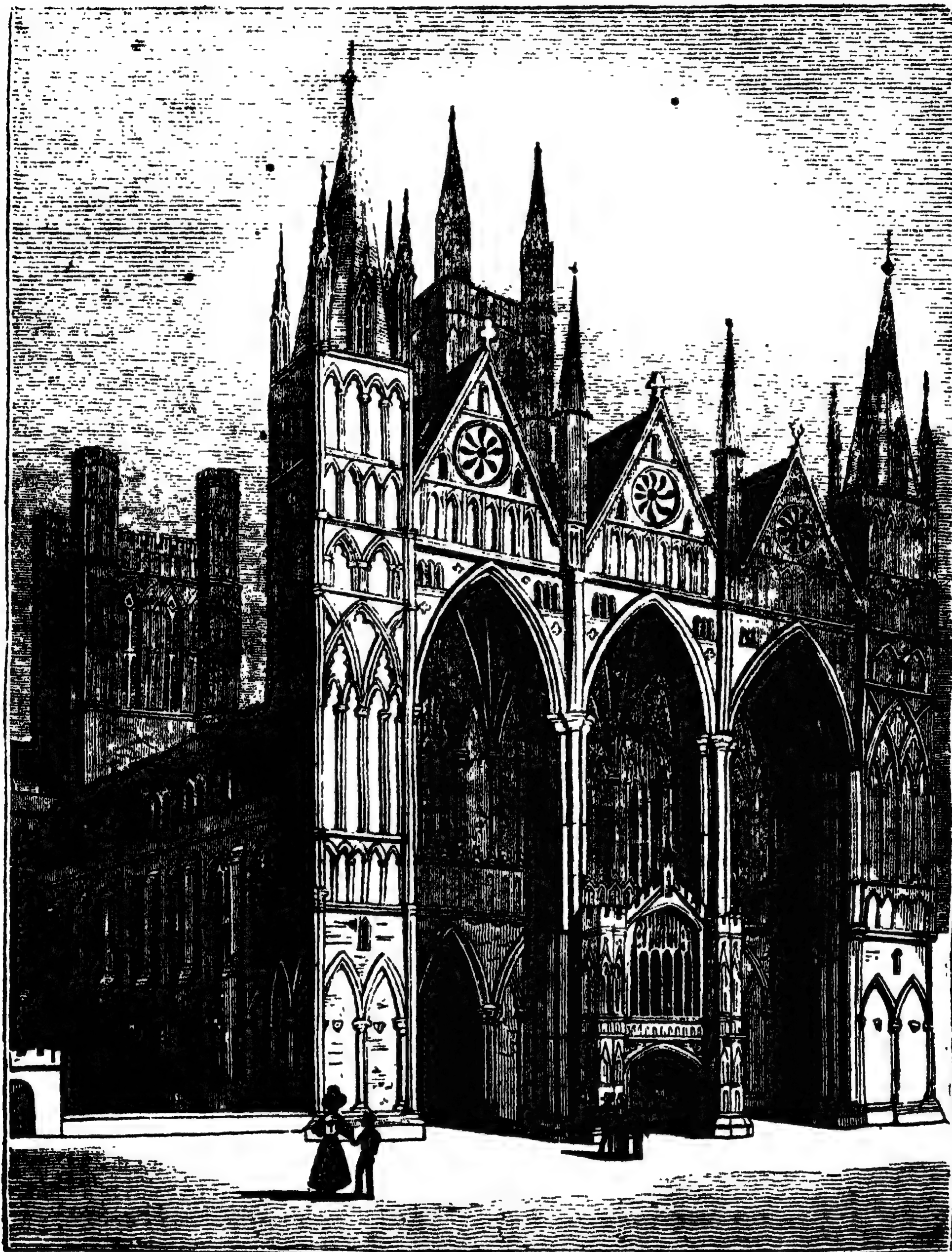
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CATHEDRAL OF PETERBOROUGH.



[West Front of Peterborough Cathedral.]

LIKE the Cathedral of Lichfield, of which we gave an account in our 61st number, the Cathedral of Peterborough possesses the advantage of nearly standing apart from every other building. With the exception of some of the prebendal houses, which abut upon the southern termination of the transept, the ground is clear for a considerable space around it on all sides. The old churchyard—long the only one in the city, and consequently crowded with tombstones—encompasses its eastern extremity, and extends along part of both the north and south sides. About ten or twelve years ago the authorities of the cathedral began to lay out this ancient and extensive cemetery in a manner somewhat similar to that of La Chaise at Paris, planting it with laurels, pines, willows, and other trees, shrubs, and flowers. These operations, which were carried on for some years, have been executed with great taste, and have proved in a high degree ornamental to the aspect of the cathedral. Before the western front is a spacious court, which is also now neatly laid out in grass-plats and gravelled walks, while rows of ancient elms combine with the noble architecture of other times, by which it is on all sides surrounded, to preserve to it an air of majesty in keeping with the sanctity of the spot. In the centre of the wall opposite to the cathedral is a turreted gate, leading to the city, and forming the entrance to the sacred pre-

cincts; in the south wall is another, which conducts to the episcopal palace; and in the north wall is a third, that of the deanery. All the three are rich and imposing structures. The site of the cathedral not being elevated above that of the surrounding country, which indeed is a dead flat for many miles, the building cannot be seen from a very great distance; but its great extent, and the height of its towers, make it a conspicuous and remarkable object from every point from which a view of the city is to be obtained. Its pinnacles and spires shoot from the foliage in which they are embosomed far beyond all the surrounding buildings.

Like the generality of our other cathedrals, that of Peterborough consists of a nave with side aisles, terminated at the east end by a choir, the further extremity of which is circular, and crossed at the middle by a transept. There is also in this instance a much smaller transept at the west end. From the centre, where the nave and the transept cross each other, rises the great lantern tower, to the height of above 188 feet. Over the two extremities of the west end are two other spires of less elevation, and one of which indeed (that to the south) appears never to have been completed. According to a measurement taken by Dr. William Parker, more than half a century ago, and printed in the late edition of Dugdale's Monasticon, the length of the whole edifice from east to west is about 480 feet, of which the nave occupies 231 feet, and the choir, from the door to the altar, 138. The breadth of the nave is 91 feet, and its height 78. The great transept is 203 feet in length, and 69 in breadth.

The character of the architecture of this cathedral is, upon the whole, rather majestic than picturesque. Every thing is in the most massive style. In the interior the pillars, which are not numerous, are of great circumference, and present an appearance of solidity and strength corresponding to the ponderous pile which they help to sustain. The most highly ornamented part of the exterior is, as usual, the west front. It is divided into three compartments, formed by so many lofty arches, in the central and narrowest of which is the great door, surmounted by a projecting structure called the Chapel of St. Thomas à Becket, having a tower with pinnacles on each side of it. The effect of this façade, which is 156 feet in breadth, while the height of the arches is 82, is in the highest degree grand and imposing.

Peterborough, originally called Medeshamsted, from the meadows on both banks of the river Nen, in the midst of which it was placed, was at first a monastery, the foundation of which is said to have been laid by Peada, king of Mercia, son of the famous King Penda, about the year 655. An old monkish writer states, that the stones which were employed in laying its foundations were many of them so large that they could hardly be drawn by eight pairs of oxen. But the buildings erected by Peada, and by his two younger brothers, Wulfer and Ethelred, who succeeded him on the throne, were reduced to ruin in 870 by the Danes, who, under the command of Earl Hubba, made a furious attack upon the place, and put the Abbot Hedda and his monks, eighty-four in number, to the sword, plundering the monastery at the same time of whatever it contained; after this they set it on fire, when it is said to have burned for fifteen days.

The monastery lay waste and uninhabited for about a century after this calamity, the area of the church coming at last to be used as a place of confinement for cattle; when, in 966, its restoration was commenced, under the patronage of King Edgar, by Athelwold, bishop of Winchester. The building, however, was again burnt down by accident in 1116. Two years after, the foundation of a new church was laid by the abbot, John de Sais, or Seez, (or, as Gunton calls him, John of Salisbury,) who was a Norman; and the structure thus begun is supposed to be the present cathedral. The part which John de Sais built was probably the east end. The work was carried on with more or less zeal by his successors; but the records of their several additions are very imperfect, and we are left to conjecture the age of some of the most important parts of the building, merely from the style of the architecture. Mr. Britton thinks that, with the exception of some unessential appendages, the whole must have been completed by about the middle of the thirteenth century. It is a curious fact, that although glass is said to have been introduced into England before the end of the seventh century, the windows of the Cathedral of Peterborough are described, more than five hundred years after this time, as only stuffed with reeds and straw.

Perhaps none of our other cathedrals suffered so greatly as this from the fanatical ravages of the republican soldiery. A body of them, in 1643, literally destroyed every thing within the building, and stripped it to the bare walls. On this occasion nearly all the ancient records and documents were torn to pieces and burnt. The cathedral has since undergone various alterations and repairs; but the most important was the restoration of the interior of the choir, most admirably executed a few years ago by Mr. Edward Blore, at an expense of £6000, which was partly contributed by the Dean and Chapter, and partly raised by subscription. The choir of Peterborough Cathedral is now, perhaps, unsurpassed in richness and beauty by that of any other in England.

The Abbey of Peterborough having been surrendered to the King by the then abbot, John Chambers, in 1540, was the following year erected into a bishopric, Chambers being consecrated the first occupant of the new see; at the same time it was ordered that the residence of the abbot should become the bishop's palace.

MINERAL KINGDOM.—SECTION 8.

ORGANIC REMAINS.

WE have already stated, and particularly in our third section, (p. 58,) that the stratified rocks contain the remains of animals and plants; and that beds of stone, situated many miles distant from each other, may be proved to belong to the same place in the order of succession of the strata, by remains of organized bodies, or FOSSILS, of identical species being found in the stone at both places. The word *Fossil*, which means any thing that may be dug out of the earth, used to be applied to all minerals; but modern geologists have conveniently restricted its application to organized bodies contained in the loose or solid beds composing the crust of the globe, and which are, for the most part, petrified; that is, converted into stone. Fossils are now always understood to be petrified remains of animals or plants, and we say *fossil* shells, *fossil* bones, *fossil* trees, &c. We are enabled to make out, by the aid of those bodies, that a bed of limestone on the coast of Dorsetshire, another on the coast of Yorkshire, a third in the western islands of Scotland, and a fourth in the interior of Germany, although differing perhaps in appearance, as far as the mere limestone is concerned, belong to the same age or period of formation in the chronological order of the strata. (See Diagram No. 1, Section 2, p. 21.)

Fossils reveal to us the important and wonderful fact, that the Author of Nature had created different species of animals and plants, at successive and widely distant intervals of time, and that many of those that existed in the earlier ages of our globe had become totally extinct, before the creation of others in later periods; that, prior to man being called into existence, innumerable species of living beings had covered the surface of the earth, for a series of ages, to which we are unable, and probably shall ever remain unable, to fix any definite limits. We farther learn, that a very large proportion of those creatures, of the later periods, had become extinct, and had been replaced by the animals which now exist,

before the creation of our first parents. When that great event took place, the crust of the earth had already undergone numerous changes, and we have already said, in alluding to those changes, that they appear to us to afford indisputable proofs of design; to be evidences the most clear of the establishment of an order of things adapted to the predetermined nature of that more perfect creature, about to be sent as an inhabitant of the globe, to whom was to be given "dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth." We are also taught by the study of fossils that, prior to the creation of man, there had existed a totally different condition of our planet, in so far as regards the distribution of land and water, from that which now exists; that where there are now vast continents there must have been deep seas, and that extensive tracts of land must have occupied those parts of the globe which are now covered by the ocean. In many parts of the interior of our continents there must have been vast lakes of fresh water, which were drained by subsequent changes in the form of the land which bounded them, and were replaced by wide valleys, long antecedent to the existence of man. Thus, in the very heart of France, in a district along the banks of the river Allier, of which the town of Vichy may be taken as the centre, vast strata, full of fresh-water shells, prove that there must have existed, for many ages, a lake nearly a hundred miles long and twenty miles in average breadth. It is proved moreover, by the nature of organic remains, that changes of CLIMATE, no less remarkable, have taken place; and that a heat equal to that now existing in the equatorial regions must have formerly prevailed in latitudes far north of our island.

The organized bodies which are found in a fossil state belong to classes of animals and plants that exist on the land, or in lakes and rivers, and to those also which are inhabitants of the sea. The latter are by far the most numerous, as might be expected would be the case, when it is considered that the greater proportion of the strata must have been deposited at the bottom of the ocean. Of marine productions, shells and corals constitute the chief part, and for this reason, that being almost wholly composed of mineral substance, they are not liable to decay. In all cases of petrified remains of animals it is the hard parts only that we find; the whole of the flesh and softer parts have disappeared, so much so, that, with the exception of some instances of fishes and amphibious animals, no trace of the external form of the living animal can be discovered; and where bones are found it is very rarely that an entire skeleton is met with. There are fossil remains of

Among bodies belonging to the Sea.	Shells. Corals and sponges. Radiated animals, such as Star Fish. Reptiles, resembling Crocodiles. Fishes. Cetacea, or the Whale tribe. Crustacea, such as Lobsters and Crabs. Plants.
Among bodies belonging to the Land.	Fresh-water shells, found in lakes and rivers. Land shells, such as the Garden Snail Quadrupeds. Reptiles. Birds. Insects. Stems of trees and wood. Smaller plants and leaves.

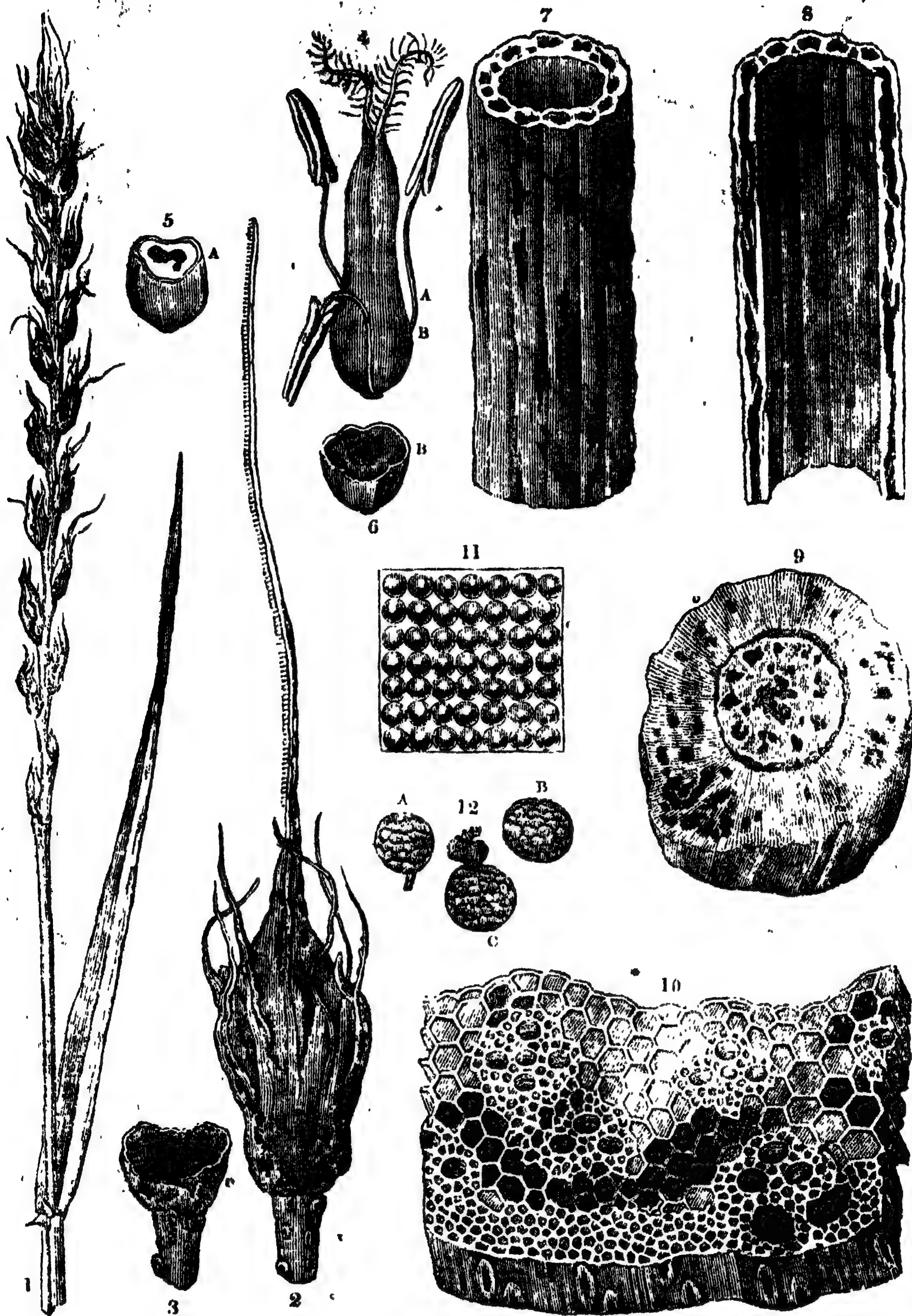
These several bodies are not found indiscriminately throughout the whole series of the secondary and tertiary strata (Diagram No. 1); some are peculiar to the lowest beds, some to the intermediate, and some to the superior. The leading features of that distribution will be afterwards explained. But *all*, of whatever description they may be, *which occur in the secondary strata*, belong to species now wholly extinct. By far the greatest proportion of those found in the tertiary strata belong likewise to extinct species. It is only in the uppermost beds that there is any very considerable number of individuals which are identical with animals now in existence, and there they preponderate over the others.

The bones of man are not more liable to decay than those of other animals; but in no part of the earth to which the researches of geologists have extended, has there been found a single fragment of bone, belonging to the human species, incased in stone, or in any of those accumulations of gravel and loose materials which form the upper part of the series of the strata. Human bones have been occasionally met with in stones formed by petrifying processes now going on, and in caves, associated with the bones of other animals; but these are deposits possessing characters which prove them to have been of recent origin, as compared with even the most modern of the tertiary strata.

The geologist may be considered as the historian of events, relating to the animate and inanimate creation previous to that period when *sacred* history begins, or the history of man, in relation to his highest destiny. Although it belongs to the geologist to study the events that have occurred within his province, during the more modern ages of the world, as well as those which are in progress in our own day, his especial object is to unfold the history of those revolutions by which the crust of the globe acquired its present form and structure. The solid earth, with its stores of organic remains, which now rises above the surface of the sea, may be compared to a vast collection of authentic records, which will reveal to man, as soon as he is capable of rightly interpreting them, an unbroken narrative of events, commencing from a period indefinitely remote, and which in all probability succeeded each other after intervals of vast duration. Unlike the records of human transactions, they are liable to no suspicion that they may have been falsified through intention or ignorance. In them, we have neither to fear the dishonesty of crafty statesmen, nor the blunders of unlettered and wearied transcribers. The mummies of Egypt do not more certainly record the existence of a civilized people in remote ages on the banks of the Nile, than do the shells entombed in solid stone at the summit of the Alps and Pyrenees attest that there was a time when the rocks of those mountains occupied the bottom of a sea, whose waters were as warm as those within the tropics, and which were peopled by numerous species of animals, of which there does not now exist one single descendant.

Some scattered observations, and some fanciful theories founded upon them, show that a few of the philosophers of antiquity, and a few among the learned since the revival of letters, were not altogether unaware of the existence of these archives; but it is little more than half a century since their true value began to be understood. The cause of this is easily explained. Geology has grown out of the advanced state of other branches of knowledge. Until chemistry, mineralogy, botany, and above all zoology, or the natural history and comparative anatomy of animals, had arrived at a considerable degree of perfection, it was impossible to comprehend the language in which these records are written. Many of the early geologists, and some even in the present day, appear indeed to find no difficulty in reading them; and when they meet with a passage which is obscure they cut the knot, and reason upon some bold interpretation, which they arrive at by conferring upon Nature powers which she herself has never revealed to us that she has employed. But since the discovery, in recent times by Cuvier and others, of a key to the language of these precious documents, many have been unrolled; the errors of former interpretations have been discovered; and we may now entertain a well-grounded hope, that if we cease to guess at meanings, and patiently search and compare the materials that are accessible to us, we shall arrive at such sound conclusions, that geology will be placed on as secure a basis as the most exact of the sciences.

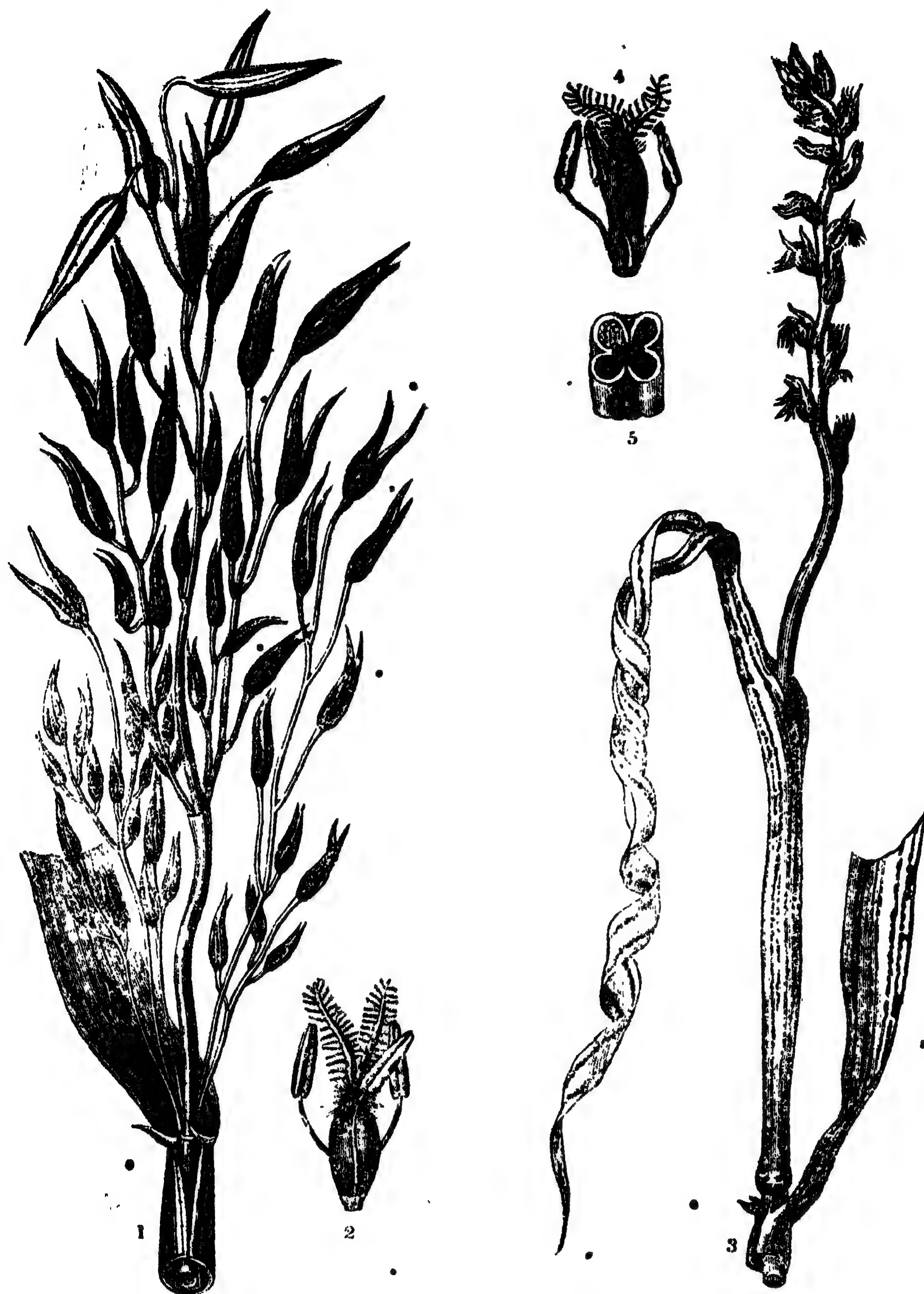
THE SMUT OR DUST BRAND.



[Table II.—The Smut or Dust Brand in Barley.]

Figure

1. A barley ear, just emerged from its hose, entirely infected with smut; natural size.
2. An infected spiket of the same ear, which was evidently infected before the individual florets were developed, and when nothing but a thin membrane or film (which is bursting in many places) holds the fungi together; magnified four times lineally, or sixteen times superficially.
3. A transverse section of the base of that spiket, which is entirely filled with the fungi, and no traces of the husks or parts of fructification are left; magnified four times lineally, or sixteen times superficially.
4. A fully developed floret from the top of an infected ear, but which the seeds of the fungi reached at a late period and only partially infected; magnified five times lineally, or twenty five times superficially.
5. A transverse section of the germen of the same floret, at the upper part about A, where it is only partially filled with the fungi.
6. A transverse section of the same germen, at the lower part B, where it is nearly entirely filled with the fungi; both figures are magnified five times lineally, or twenty five times superficially.
7. A small portion of the stem or straw of a barley plant, strongly infected with smut or dust brand, the fungi multiplying so rapidly that they burst the epidermis in many places; magnified ten times lineally, or one hundred times superficially.
8. A longitudinal section of the above portion, to show the destructive effects occasioned by these fungi internally; magnified ten times lineally, or one hundred times superficially.
9. A transverse section of one of the knots or joints of the stalk of a barley plant, showing that not only is the stalk or straw infected, but that the hose or leaf sheath is likewise so; magnified ten times lineally, or one hundred times superficially.
10. A transverse section of a portion of the stalk of a barley plant, showing how the fungi spread and multiply in the cellular substance of the plant; magnified ten times lineally, or one hundred times superficially.
11. $\frac{1}{160000}$ part of a square inch, on the micrometer, sustaining forty-nine ripe fungi of *uredo segetum*, or smut or dust brand; magnified four hundred times lineally, or 160,000 times superficially, showing that not less than *seven millions eight hundred and forty thousand fungi* of uredo segetum would be required to cover a square inch, English measure.
12. A, a fungus of uredo segetum, not quite ripe; B, a perfectly ripe one; and C, one in the act of shedding its seeds; each figure magnified one thousand times lineally, or 1,000,000 times superficially.



[TABLE III.—The Smut or Dust Brand in Oats; and the Smut or Dust Brand in Wheat.]

Figure

1. A slightly infected panicle of an oat plant, about three days after emerging from its hose, when the infection is rapidly increasing through the whole panicle; natural size.
2. The parts of fructification of one of the florets, in the uppermost parts of the panicle, showing the progressive action and infection of the fungi; the germen is already filled, and the pistils and tender filaments are full of black dots internally, consisting of small clusters of fungi, which multiply so rapidly, that in a very few days they burst and break all the membranes and cuticles, and entirely consume all these parts; magnified five times lineally, or twenty five times superficially.
3. An infected wheat ear, which was evidently infected, and nearly consumed, long before it emerged from its hose: after the destruction of the ear the fungi attacked the hose and leaves which are split and twisted in various forms, whilst the fungi, appearing first in stripes and rows, multiply till the whole leaf and every part of the plant are destroyed; natural size.
4. The parts of fructification of a wheat ear, which was evidently attacked after the parts of fructification were completely developed: the germen, the pistils, the filaments, and anthers are entirely filled with the fungi, and ready to burst; magnified five times lineally, or twenty five times superficially.
5. A transverse section of a portion of one of the above anthers, showing that three of its cells are already filled with the fungi, but the fourth cell is still filled with the original sound pollen grain; magnified twenty-five times lineally, or six hundred and twenty-five times superficially.

THIS disease, like the *Smut Balls* or *Pepper Brand*, is occasioned by a very minute parasitic fungus, of the genus *uredo*, which Persoon (in his Synopsis Methodica Fungorum) notices as *uredo segetum*. It is, however, of a decidedly different species from *uredo fœtida*, which occasions the Smut Balls or Pepper Brand, illustrated in my former paper.

The *uredo segetum* is distinguished from *uredo fœtida*, not being much more than one-half the size (see Table II., figs. 11 and 12), and by being perfectly scentless; whilst *uredo fœtida* is characterized by an extremely offensive smell. The manner in which *uredo segetum* acts upon the plants which it attacks is also very different, and the effect much more destructive than that of *uredo fœtida*, which only attacks the grains in which it vegetates, but seldom bursts; whereas the *uredo segetum* not only generally destroys the whole

ear, but even the leaves and stem. Further, *uredo segetum* attacks not only barley, but wheat and oats; and I have been informed that other species of gramineæ are subject to its attacks, but I have not yet found any such specimens.

I have ascertained, by repeated experiments of inoculation, that the seed of the fungi of *uredo segetum*, like that of *uredo fœtida*, is absorbed by the roots of the germinating seed-corn, and, being so extremely minute, is mixed with and propelled by the circulating sap, and deposited in almost every part, even in the cellular tissue of the plant (see Table II., figs. 7, 8, 9, and 10), where these seeds continue to vegetate and multiply rapidly, as well as in every part of the plant where there remains the least vitality. The whole ear is often found entirely destroyed many weeks before even the individual florets are quite developed, or the sound ears emerge from the hose. Sometimes, but rarely, the infection takes place after the parts of fructification have been formed, and even after fecundation has taken place; in that case the progress of the disease can easily be observed. The germen is generally the first attacked, and found partially, or half filled with the fungi (see Table II., figs. 4, 5, and 6); then the pistils, the stigmas, the anthers; and even the extremely tender filaments appear full of black spots (see Table III., fig. 4), which are occasioned by small clusters of these fungi, which vegetate and multiply so rapidly that in a few days the whole ear is completely filled.

In oat-plants such late infection occurs more frequently than in barley or wheat, and the whole panicle often emerges from its hose, to all appearance in a perfectly sound state, or perhaps with only a few infected spikets at its base, but the infection soon spreads visibly through the whole panicle (see Table III., fig. 1), and over every part of the plant; and even when such a partially infected ear is separated from the growing plant, the vegetation and multiplying of the fungi continue as long as any moisture remains in that portion of the plant which has been so separated. I once collected and cut off several such partially infected ears, which I intended to preserve as specimens, and for that purpose I laid them in brown paper to dry them: they were accidentally mislaid, and did not come into my hands again till after a period of six or seven months; when, on examination, I found that the whole specimens were consumed by the fungi. I have not the least doubt that the seeds of the fungi are shaken out by the wind; and that even many infected ears and plants are thrown on the soil of a field where such diseased plants have been growing, and that the fungi continue growing and multiplying on the soil, like those on the paper, until they become part of the soil, from which they cannot be distinguished.

I fear it will prove very difficult to find an efficient remedy to prevent, or even to check this destructive disease; and this fear seems strengthened by the consideration of the numerous remedies suggested by many eminent authors, as well in this country as on the continent. That the remedies of these authors should have failed in producing the desired effects is not surprising to me, for I find that the most eminent of them not only confound two or three distinct diseases, but are totally unacquainted with the real cause of any of the diseases: for some consider them caused by insects; some attribute them to blasts of the wind; others consider the disease to be a corruption of the sap of the plant. These, and many other causes, equally erroneous, have been advanced; but I hope that, if it be admitted that the seeds of the parasitical fungi are the real and only cause of this disease, it will naturally occur to every one, that if the vitality of the seeds of these parasites could effectually be destroyed, the disease would be prevented. That the steeping in lime-water destroys the vitality, I have proved by many experiments; and also that lime-water has the same effect upon the seeds of the *uredo segetum*, as it has upon those of *uredo fœtida*.

I fear that much difficulty will present itself to the steeping the seed-corn effectively, from the structure of the seed of barley and oats, the kernels of which are so tightly enclosed in the husks, that the lime-water cannot so readily penetrate, and reach the embryo, as in the naked seed-kernels of wheat and rye; but if some ingenious and unprejudiced practical agriculturist would make experiments on a large scale, by which every grain of the seed-corn could be effectually steeped in lime-water, I have no doubt but that the diseases of the *Smut* or *Dust Brand*, and the *Smut Balls* or *Pepper Brand*, would be effectually prevented, and perhaps, after repeating the experiments for a few successive years, these diseases might be entirely eradicated from the land.

Kew, March 3, 1833. F. B.

A GAME AT SKITTLES.

I was lately walking, on a fine spring evening, in the suburbs of a country town. It was that particular period of the season when all nature suggests thoughts of hope and cheerfulness. The hedge-row elms had scarcely put on their new livery of green, and the orchards were just sprinkled over with their bunches of opening blossom. The first notes of the nightingale and the cuckoo fell on the ear as if to say, "the summer is coming." Every animate being seemed glad and happy.

My ramble brought me to a public-house by the road side. I was tired, and sat down for a minute's rest on the bench which invited the weary passenger. There was a ground adjoining the house, where some mechanics and labourers were engaged in various sports; and as it was imperfectly concealed from the road, I saw and heard what was passing. I was quickly disgusted. I saw the clenched fist of passion, and I heard the fearful oath of desperation. There stood one who grinned with a malicious exultation at the angry countenance of the opponent that he had beaten; and there another, who, while he staked his little all with a frantic eagerness upon the chances of the game, was endeavouring to forget the consequences of his folly in quick draughts of intoxicating liquor. In one corner of the yard sat a patient, and apparently a gentle young woman, weeping for the obstinacy of her husband, who refused to accompany her home; in another, an angry master was upbraiding an idle and insolent apprentice, who had been seduced from his employ by more hardened companions. Such, said I, are the baneful temptations which make the industrious lazy, and the sober dissipated; which deprive too many working people of their happiness and their respectability; which render them discontented with the present and forgetful of the future; which cause them at once to despise the laws of their country, and the commands of their God. There is no safety in that place where the demon of *gambling* shall once enter.

As I walked hastily out of the yard, my attention was arrested by these words, "My dear boy, if you value your father's blessing, never go into a skittle-ground." This was addressed by a decent, middle-aged man, to a little boy, about nine years old, who had hold of his hand. A respectable looking woman, who was resting on her husband's arm, added her own injunction. "Mind what your father says, John, and you will never suffer as he has done by a game at skittles." My curiosity was roused: I entered into conversation with the good people. I found the man possessed much strong sense, and he had evidently bestowed some pains in the acquirement of useful knowledge. He was a gardener by trade; one of a class of men that I have often observed are more sober, thoughtful, and intelligent than the majority of artisans. His wife appeared a kind-hearted and affec-

tionate woman, who loved her family and was contented with her lot. Our conversation gradually became more free; and at last I ventured to say to the worthy man whose name I found was William Johnson, "And pray what evils have you experienced from a game at skittles?"

As I proposed this question we arrived at a cottage which stood on the side of a small nursery-ground and market-garden. The little flower-garden in front of the house was laid out with the greatest care; and the tulip and the carnation, yet unblown, but watered and sheltered with the most exact attention, showed that the florist's business and enjoyment were in a great degree united. The good man smiled as he invited me to enter his gate; and his wife placed a chair for me in their comfortable parlour, and said, "There was a time when I could not bear to think of the skittle-ground; but William's old misfortunes now only serve to make us more thankful for our present happiness."

"Fourteen years ago," said Mr. Johnson, "I came to work as foreman to my wife's father. This garden and house were his property. He was aged and infirm; and I endeavoured to discharge my duty, and to recommend myself to his good opinion, by industry and fidelity. He soon left to me the entire charge of his business, and it prospered so under my management, that he admitted me into his most perfect confidence. He had an only daughter. My occupation in the garden frequently brought us together; and an attachment was quickly formed between us, which the kind old man rather encouraged than repressed."

"He was ever an affectionate parent," said the wife.

"All went on well for a year. One evening I took a walk alone by the road where you met me. On the bench at the public-house, a gardener, who lived in the next village, was smoking his pipe. He invited me to join him; and in a short time a companion came out of the skittle-ground and challenged him to play. I thought there would be no harm in looking on. The gardener played unskilfully; and as I had seen something of the game when a boy, my vanity induced me to take up the ball to show him how he might have knocked down the pins. I accepted a challenge to play; and we played for money: I won two shillings. My opponent made me promise to give him his revenge the next night. I went home late, with a new passion in my breast.

"The next evening, after my day's labour, I went to the skittle-ground: I lost nearly a week's wages, and I got half intoxicated. The passion for gambling then began to haunt me like an evil spirit. I was restless and discontented in my business; if I gave my hours of leisure to Susan, I was absent and sullen; the affectionate lessons of the old man were tedious and insupportable. My hours of innocence were gone. I went on from bad to worse. When I came to live with my Susan's father I possessed fifty pounds; and I had hoped to have added it to his stock, and have become his partner as well as his son. I drew this out of the bank where I had placed it. There were other temptations besides the skittle-ground. My new companions introduced me to public-houses, where, in dark and stinking back parlours, there was card-playing and dicing. I still lost my money, for I hated myself, and I was therefore impetuous. The hours of leisure became too little for my fatal pursuit. I often went to these haunts of infamy at my dinner time; and, like a careless and wicked servant, I sometimes stayed through the whole afternoon. The garden became neglected; and my good old master's trade fell off. He had heard of my follies, and he told me, with a firmness which nothing could shake, that, for the peace of himself and his child, we must part.

"I had long seen how my fatal passion would terminate; but yet I was so besotted that I thought my master used me ill. I loved his daughter, though I had treated her unkindly; and I fancied that, if I could recover back my little property, the objection to our union would cease. I went to the town, and spent all my remaining money in the purchase of a lottery ticket.

"The day came on which I was to quit my good old master. He would not allow me to see Susan; but he wept bitterly as he gave me his hand. I fell at his feet, and confessed my errors with a sincere contrition. But he would not hear of any proposition that I should continue with him. He loved his daughter too well, he said, to confide her happiness to a gambler.

"The day on which I left a place which had been so dear to me was the day on which the drawing of the lottery was announced. I went to the office. I could hardly ask the fate of my ticket; when the clerk said it was a blank, I stood like an idiot. I rushed out of the town, and passed the night in the fields. The next wicked impulse of my mind was to destroy myself; but, God be thanked, I struggled with that temptation. In the morning I recovered a little composure. I prayed most fervently for support in better courses, and my prayer was heard.

"I wandered on to the next town. I saw, from a newspaper, that a gentleman wanted a gardener, and I was fortunate in procuring the situation. My master was a kind-hearted man; for I told him of my folly, and he trusted in my penitence. For two years I served this good gentleman with diligence and fidelity. I lost not an hour; and I shunned all sort of gambling as I would the plague. At the end of that time I heard that the father of Susan was no more. I hastened to assure her of my repentance and my reformation. I had saved a little money once again; I threw it into her lap, and it enabled her to pay a pressing creditor, for her father's business had been neglected, and he had scarcely left money enough to discharge his debts. She had confidence enough in me to accept this sum as a loan. In another year, her prudence did not prevent her affection from receiving me as a husband. We married; and the world has gone smoothly with us. But I sometimes grieve to think how my errors must have embittered the lives of those I loved; and I thank my God, who did not desert me in my extremest temptation. So now you see why I cautioned my boy against a 'game at skittles!'"

Such was in substance the story of William Johnson's temptation. His case is not a singular one. There is little incident in his narrative; but I have written it down in the hope that the example may do good, by showing how easily the best disposed may yield to evil, and how resolutely they must struggle with such seductions, to prevent them making a total wreck of their happiness and respectability.

THE CONDOR.

One of the figures in the following wood-cut represents a specimen of the great vulture of South America, popularly called the Condor, which is now to be seen in the Surrey Zoological Gardens. Although of large dimensions, the condor of reality is a much smaller bird than the condor of fable. One of the great advantages of menageries is that of being able with our own eyes to distinguish truth from fiction;—and thus, in the bird before us, we see an exceedingly muscular and powerful creature, some two or three feet in height, with wings measuring from six to eight feet from the tip of one to the tip of the other;—but we cannot here find the bird that is large enough and strong enough to carry off a buffalo in his claws, as an eagle would a rabbit. Such stories have, however, been told of the condor. Humboldt, the distinguished traveller in South America, was the first to show the absurdity of these old fabrications. He passed seventeen months in the Andes, the native mountains of

the condor; he saw the bird daily; he shot many specimens; and he is satisfied that in general their average size does not exceed that of the largest European vultures.

The authentic history of the condor is full of interest. The eagle builds "his aery on the mountain top;" but the elevation at which the eagle lives is far inferior to the snowy peaks of the Andes, where the condor has his abiding place. At the extreme limit of vegetation, where all other animals perish, the condor prefers to dwell, inhaling an atmosphere so highly rarefied that almost every other creature would perish in it. From these immense elevations this wonderful bird soars still higher up, far above the clouds; and thence, with an almost unlimited range of sight, he surveys the earth. Scenting some carcase upon which he may banquet, he descends into the plains; and there he gorges himself with a voracity almost without example. Captain Head, in his 'Rough Notes,' has given an example of this habit of the condor:—"In riding along the plain I passed a dead horse, about which were forty or fifty condors: many of them were gorged and unable to fly; several were standing on the ground devouring the carcase—the rest hovering above it. I rode within twenty yards of them: one of the largest of the birds was standing with one foot on the ground and the other on the horse's body." He adds that one of his party had also ridden up to the dead horse; and as one of these enormous birds flew about fifty yards off, and was unable to go any farther, he rode up to him, and then, jumping off his horse, seized him by the neck. The man, who was a Cornish miner, said he had never had such a battle in his life, although he was at last the conqueror.



[The Condor. From a living specimen.]

The condor does not exclusively feed upon dead or putrefying flesh; he attacks and destroys deer, vicunas, and other middling-sized or small quadrupeds. It is said, also, to be very common to see the cattle of the Indians, on the Andes, suffering from the severe wounds inflicted by these rapacious birds. It does not appear that they have ever attacked the human race. When Humboldt, accompanied by his friend Bonpland, was collecting plants near the limits of perpetual snow, they were daily in company with several condors which would suffer themselves to be quite closely approached without exhibiting signs of alarm, though they never showed any disposition to act offensively. They were not accused by the Indians of ever carrying off children, though frequent opportunities were presented, had they [illegible] disposed. Humboldt believes that no authen[illegible] case can be produced, in which the lammergeyer [illegible] vulture) of the Alps ever carried off a [illegible] though so currently accused of such theft; but that the possibility of the evil has led to the belief of its actual existence.

The condor is not known to build a nest, but is said to deposit its eggs on the naked rocks. When hatched, the female is said to remain with the young for a whole year in order to provide them with food, and to teach them to supply themselves. In relation to all these points, satisfactory information still remains to be procured.

Humboldt saw the condor only in new Grenada, Quito, and Peru; but was informed that it follows the chain of the Andes, from the equator to the 7th degree of north latitude, into the province of Antioquia. There is now no doubt, says the Encyclopædia Americana, of its appearing even in Mexico, and the south-western territory of the United States.

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THE BAR-GATE AT SOUTHAMPTON.



[North Front of Southampton Gate.]

The curious relic of ancient architecture represented in the above cut, crosses the principal street of the town of Southampton, called the High-street, or English-street, at the point where the town is considered to terminate, and the suburbs to commence. It is, in fact, one of the gates of the wall by which the town was formerly surrounded, and considerable portions of which are still standing, while the line can be distinctly traced throughout its whole extent. Of several gates, however, by which these encompassing fortifications were anciently adorned, the Bar-gate is, we believe, the only one that now remains.

Among the Saxons what we now call a gate was commonly called a bar, the term *gate* being used to describe the street or road itself, as it still is in Scotland. Of the old application of the word *bar* we have instances in *Temple Bar*, *Holborn Bar*, and *Smithfield Bar*, or *Bars*, in London. The Bar-gate, the name by which the

structure at Southampton is commonly known, seems to be a corruption which had arisen from the continued use of the term *bar*, after its original meaning had been forgotten.

The town of Southampton is built on an elevated gravelly piece of ground, lying at the head or northern extremity of the bay, called the Southampton Water, being flanked on the one side by the river Itchin, and on the other by the Test or Anton, which fall severally into the north-east and the north-west corners of the bay. The most conspicuous object which the town presents, when viewed from a distance, is a modern building, which has been erected over the site of the keep of the old castle. The town, which no doubt took its origin from the castle, appears to have sprung up in the Saxon times. The earliest mention of it is in the Saxon Chronicle, under the year 873. Some three or four centuries ago it was a place of great opulence and importance, sustained by an active trade, principally in wine, with France and Portugal. Since the commencement of the seventeenth century, however, its commercial consequence has much decayed; but it is still a large and flourishing town, containing, according to the late census, not much under twenty thousand inhabitants, of which number considerably more than a third part had accrued in the course of the preceding ten years. Its situation, overlooking the sea to the south, and a very rich country, abounding in water and woodland scenery, in all other directions, is one of great beauty.

High-street or English-street runs nearly due south and north, and is in all about three quarters of a mile in length, of which two-thirds are below or to the south of the Bar-gate. The remaining portion is called High-street above Bar. Leland the antiquary, in the middle of the sixteenth century, describes this as one of the fairest streets in England; and its length, straightness, and spaciousness, together with the character of its buildings, still entitle it to that encomium. But its proudest ornament is the imposing structure already noticed. The most ancient part of the Bar-gate consists of a massive semicircular arch, which is undoubtedly to be referred to the early Norman, if not to the Saxon times. Beyond this, on the north side, has been subsequently erected a high and pointed arch, richly adorned with mouldings. The whole of this front now forms a sort of semi-octagon (or the half of an eight-sided figure), terminated at each extremity by a semicircular tower. Each of these towers has been perforated in modern times by a doorway crossing the foot-path at the side of the street; but anciently they seem to have had lateral entrances (which are now built up) from under the arch. The south front, or that which looks to the town, appears to be in a more modern style of architecture than any other part of the gate. The structure indeed has undergone alterations at different times in almost every part; and some of the decorations which have been added to it are far from being in the best taste. The ancient battlements, however, by which the whole is crowned, have escaped such innovation and disfigurement; and their aspect is remarkably majestic and venerable. The part of the building immediately over the arch is occupied by the town-hall, which is a room 52 feet in length by 21 in breadth; and over this are spacious leads, from which there is an extensive view of the town and the surrounding country.

Among other decorations on the north front of the gate, are two figures, said by tradition to represent the famous hero of Romance, Sir Bevis of Hampton, and the giant Ascapard, whom he slew in single combat. The reader may recollect an allusion to Ascapard, or Ascabart, as he is there called, in the first canto of Scott's Lady of the Lake, which the author has illustrated by a quotation from an ancient manuscript copy of the 'Romance of Sir Bevis.' The following is the modernized version of the same passage, which is given by Ellis, in his Specimens of the Early Romances:—

"This giant was mighty and strong,
And full thirty feet was long.
He was bristled like a sow;
A foot he had between each brow;
His lips were great and hung aside;
His eyen were hollow, his mouth was wide;
Lothly he was to look on than,
And liker a devil than a man:
His staff was a young oak,—
Hard and heavy was his stroke."

Of Sir Bevis there are other memorials at Southampton besides the figure on the Bar-gate; especially an artificial elevation, called Bevis Mount, which seems anciently to have been fortified.

OLD TRAVELLERS.

ROBERT KNOX.

It may not be unentertaining or uninstructive to turn our attention, from time to time, to the lives and adventures of old voyagers and travellers. Many of these men were the first to find their way to remote regions of the earth, and most of them may be said to have added something to our knowledge of the globe we inhabit, and of our fellow-creatures. Though the accounts published of the distant wanderings of these adventurous individuals were generally received with ready belief and admiration at the times when they appeared, yet they became subject to the doubts, and even derision, of a more sceptical age. The extensive discoveries and enterprising voyages by land and sea of our own days have, however, relieved the old writers of travels from a great part of the odium which oppressed them, and have rendered them again objects of interest and admiration, by showing that they are correct in the main, and generally to be depended upon when they describe what they saw themselves, and not what was related to them by others.

One of the circumstances which ought particularly to recommend these old travellers to the notice of our readers is, that they were for the most part men of humble conditions in life—seamen, soldiers, traders, &c.—whose want of education was made up by attentive observation, and by cultivating those perceptive faculties which we are all pretty equally endowed with. By the use of their own eyes, and the lights of their reason, these men have in many instances left us the most impressive though simple pictures of nature. Their descriptions have a force and freshness differing from, but indeed far superior to, any thing of the sort produced by what were called the learned men of their days, whose minds were filled with systems and theories, and who had most of them a love of giving hard names to things, instead of investigating the *things* themselves.

There is no lesson more valuable than a plain exposition of the modes in which these old travellers struggled against misfortune and privations of all sorts, and exerted the best energies of man, even when their circumstances seemed "past hope, past cure, past help." There is not perhaps in their whole body an individual who underwent more remarkable trials in this way, or more distinguished himself by those valuable descriptions we have just alluded to, than Robert Knox, the author of an Historical relation of the Island of Ceylon, in the East Indies. This book was lately cited as an authority in the 'Penny Cyclopædia,' under the head of 'Adam's Peak,' a remarkable mountain in the centre of Ceylon.

Robert Knox, a youth of nineteen, embarked at London in the year 1657, with his father, who commanded a ship in the East-India Company's service. The object of the voyage was to reach the coast of Coromandel, and to trade one year from port to port in

India. This was fulfilled with success; but as the ship was about to return to England she lost her main-mast, on which the captain put into the commodious port of Cotiar, in the island of Ceylon.

At this time Ceylon was in possession of the Cingalese, or natives, and of the Dutch, who had driven out the Portuguese, the first European settlers, and who were excessively jealous of all other Europeans, lest they in their turn should be expelled—as they finally were by the arms of Great Britain. The Dutch were in possession of the best part of the coasts of the island, and as their unfriendly feelings were well known, Robert Knox's father had avoided their dominion. The Cingalese were masters of all the interior of Ceylon, and of some places on the coast not fortified by the Dutch; among which was the port of Cotiar, whither the English captain had repaired, without sufficient knowledge of the singular character of that people, or rather of their government.

On the first arrival of the English they were courteously received; but as soon as the King of the Cingalese (who had already had enough of European intruders) heard of the event, he determined to entrap them, and, if possible, to make them all his captives for life. A Dissauva, or general, who was sent with some troops down to Cotiar, succeeded with treacherous artifice in entrapping Robert, the subject of this sketch, with another man, and then Robert's father, and seven of the ship's crew. The day after the capture of the commander, the long-boat's crew, without any suspicion that he was detained otherwise than as a friendly guest, went on shore to cut wood: they also were suddenly seized. The crafty Cingalese had now the only two boats that belonged to the ship, and eighteen Englishmen in their power. The ship itself, with all it contained, was saved from their hands only by the captain's heroic devotion to his duty. Under pretence of ordering his mate to quit the safe open bay of Cotiar, and bring the ship up a narrow river that flows into it, where she might easily have been taken by force, he had sent orders to those on board to remain where they were, to keep the guns loaded, and the ship ready to sail, whether he might escape or not. Some days after this the Cingalese general seeing that the supposed instructions were not obeyed, complained in an angry manner to Robert's father, who replied, that the seamen would not obey his orders, because he was kept as a prisoner away from them. The captain's attempt to obtain his own liberty was ineffectual; but the Dissauva allowed Robert to return to the ship, to repeat, as the Cingalese supposed, the instructions that it should be brought up the river.

Robert Knox was now a free man, on board a stout ship, where danger from the Cingalese could not reach him. He knew not what fate awaited him from a semi-barbarous people, irritated by disappointment, should he return to shore; he had already tasted the bitter cup of captivity, but his father was a prisoner, and he would not abandon him. "He charged me," says he, "upon his blessing, and as I should answer it at the great day, not to leave him in this condition, but to return to him again; upon which I solemnly vowed, according to my duty, to be his obedient son." As soon therefore as he had impressed on the chief-mate on board the necessity of being vigilant, and ready at every moment to sail, and had arranged an answer, in the name of the ship's company, to the Dissauva, stating, "that they would not obey the captain, nor any other in this matter, but were resolved to stand upon their own defence," he went on shore alone, and returned to his father and to captivity, "in the hands of the heathen."

The Dissauva losing all hopes of becoming master of the ship, now permitted Robert and his father to send off to her for such things as they stood in need of, flattering them that his king would soon send an order to release all his prisoners. After two months of that hope "deferred" which "maketh the heart sick" Robert's father, concluding he was only played with, and anxious for the interests of those he served, ordered the mate to wait no longer for him, but to sail immediately. The vessel then weighed anchor, and stood away for the continent of India, leaving behind at Ceylon, in a most melancholy state of abandonment, Robert Knox, his father, and fourteen other individuals. The two sailors who were sent with the first message to the ship, of course remained on board, and escaped.

When the Cingalese King learned that the ship had sailed, the English prisoners were left at a short distance from the sea-coast, the task of supporting and guarding them being abandoned to the charge of such natives as resided on the spot.* Precautions were taken, however, to keep the crew of the long-boat separate from the rest of the captives. A fond hope which Robert and those with him entertained of being able to make a hazardous escape, by seizing a small Arab ship that had been taken by the Cingalese and lay in the river, was frustrated by orders to distribute the English prisoners in different towns or villages, and not allow them to communicate with each other. "Yet God was so merciful," says Robert, whose filial affection never forsook him, "as not to suffer them to part my father and I."

All hope of ever again seeing their friends and their native country, gave way to despair; when, sixteen days after this, another order came to remove them into the interior of the island. On this occasion Robert's party was joined by the long-boat's crew. "It was," he says, "a heavy meeting; being then, as we well saw, to be carried captives into the mountains: that night we all supped together." The next morning they began their journey towards Kandy, the capital of the king whose prisoners they were, escorted by Cingalese troops.

Their way lay through a country almost entirely covered with immense forests, and destitute of inhabitants. "For four or five nights they lay on the ground, with boughs of trees only over their heads." This would have been no great hardship in that warm climate had it not exposed them to wild beasts, venomous reptiles, and the still more terrible jungle-fever. They seem, however, to have been pretty well supplied with provisions by the inhabitants of the scattered villages through which they passed, who had never before heard of Englishmen.

When within a few miles of the capital, another message came from the king, commanding the sailors to be again separated and placed one in a village, that their support might fall the easier on the people, who alone were charged with it. Robert, his father, and two other men, were, however, left together in one place near to Kandy, as they were the most important of the captives, whom, it was expected, the king would summon to his court. But as two months passed without any such summons "the great men" determined to break up this party of four, and billet them, one by one, like the sailors, in distinct and distant villages. Robert, to his great happiness, again prevailed with the Cingalese, that they would not separate the son from his father, and some time after they were removed together to a pleasantly situated village, about thirty miles to the north of Kandy. Here their lodging was "an open house, having only a roof, but no walls." His father was accommodated with a sort of bedstead to sleep upon; but Robert had only a mat spread upon the ground.

Though this place was pleasant to the eye, it was like so many other beautiful spots in India, pernicious to the health. Even the inhabitants of the place who were natives, and as such less liable to the endemic fevers, were nearly all sick when the Knoxes came among them, and many died.

Amidst the mortality of the natives, it was not likely strangers should escape. Both Robert and his father caught the fever, and lay for some time helpless, and, as it were, on the threshold of the grave. The old man's

fever did not last long, but grief and despair preyed upon his constitution, sadly weakened by the attack it had sustained. He lay for three months almost motionless on his rude couch, having nothing between him and the boards but a Cingalese mat, and a piece of carpet which he sat upon in the boat when he came ashore;—a small quilt was his only covering. As for Robert he had no other covering than the clothes on his back; "but when I was cold," says he, with touching simplicity, "or that my ague came upon me, I used to make a fire, wood costing nothing but the fetching."

The most frequent and most passionate regret of the despairing father was, that he had induced his son to share his captivity. "What have I done when I charged you to come ashore to me again," he used to say; "your dutifulness to me hath brought you to be a captive. I am old and cannot long hold out, but you may live to see many days of sorrow, if the mercy of God do not prevent it." The sense of his condition once struck the old sailor with "such an agony and strong passion of grief," that for nine days he would take nothing but cold water. Yet in the depth of his despair, and when "consumed to an anatomy, having nothing left but skin to cover his bones," he would often say, "*that the very sound of liberty would so revive him that it would put strength into his limbs!*"

On the evening of the 9th of February he felt death was at hand, and said that its approach was delicious. He called Robert, who was scarcely able to crawl at the time, to his bedside; he spoke tenderly of his other son and of his daughter in England, gave Robert good advice and his paternal blessing;—he regretted again that he had been made a prisoner through him, but said, "Yet it was a great comfort to him to have his own son by his death-bed, and by his hands to be buried, whereas otherwise he could expect no other but to be eaten by dogs or wild beasts." He then calmly gave instructions about his burial. After this he fell into a quiet slumber. "It was about eight or nine o'clock in the evening, and about two or three in the morning he gave up the ghost, February 9, 1661, being very sensible unto the very instant of his departure."

This exemplary son, who had now to perform his last sad duties to his parent, was sick and weak, and, as he thought, "ready to follow after him." They had been allowed to retain a black servant-boy brought in the ship from the coast of Coromandel, and who was with the elder Knox when he was made prisoner; but this fellow on finding himself among people of his own complexion, and that his masters were too weak to enforce obedience, would do little or nothing for them. Robert, however, now induced the lad to go to his Cingalese neighbours and entreat them for help to carry his father to the grave. Some of the natives came to him, "but," says Robert, "they brought forth a great rope they used to tie their cattle withal, therewith to drag him by the neck into the woods, saying, '*they could afford no other help, unless I would pay for it.*'" The mere idea of treating the remains of his father so irreverently grieved him much. "Neither," continues he, "could I with the boy alone do what was necessary for his burial, though we had been able to carry the corpse, having not wherewithal to dig a grave, and the ground very dry and hard. Yet it was some comfort to me that I had so much ability as to hire one to help; which at first I would not have spared to have done, had I known their meaning." His "ability," or money, consisted only in one pagoda and two or three dollars, which his father had with him when he was treacherously made prisoner by the Cingalese. "By this means," he continues, "I thank God, in so decent a manner as our present condition would permit, I laid my father's body in the grave, most of which I digged with my own hands; the place being in a wood, on the north side of a corn-field, where heretofore we had used often to walk together. * * * And thus was I left alone, desolate, sick, and in captivity, having no earthly comforter."

Though in this melancholy extremity, Robert's strength of mind never wholly forsook him. On the days when he was free from the ague or the cold fit of his obstinate fever, it was his custom after dinner to take one of his books and go into the fields and sit under a tree, reading and meditating until evening; and when his fever wholly left him (which it did after sixteen months of suffering) he resorted to more active amusements. The principal of these was angling for small fish in the brooks; and this was not only a recreation but of solid use to him, as the natives, reduced to hard shifts themselves, could often give him nothing but rice, and that in insufficient quantities. About this time, also, his mental resources and comforts were increased by the acquisition of an English bible, which an old Cingalese had picked up at the town of Colombo on the coast. Poor Robert in his eagerness would have given the last coin of his little stock of money for this book, but the old man was satisfied with a cotton cap.

It was not until a year after his father's death that he got sight of any of his countrymen and fellow-prisoners. At the end of that time John Gregory with great difficulty obtained leave to go and see him. This meeting may well be supposed to have been affecting; and Robert Knox had the consolation of learning that the sailors were not only all alive but well, (having been placed in more healthy parts of the island,) and permitted even to meet together at one town in the district of Hotteracourly, about the distance of a day's journey from Robert's station. After some time and many earnest entreaties (for Robert, as being the prisoner of greatest consequence, was most jealously guarded) he was permitted to return John Gregory's visit. "Being arrived," says he, "at the nearest Englishman's house, I was joyfully received, and the next day he went and called some of the rest of our countrymen that were near, so that there were some seven or eight of us met together. * * * They were now no more like the prisoners I had left them, but were become housekeepers and knitters of caps, and had changed their habits from breeches to clouts, like the Chingulays. They entertained me with very good cheer in their houses, beyond what I did expect."

Robert profited by this visit, and learned from the sailors the art of knitting caps, for which there seems to have been a ready market among the Cingalese. After prolonging his visit to three days he returned to his old quarters near his father's grave. On arriving there he immediately set to work on the simple manufacture of caps; for his money was nearly all gone, and he wanted the means to purchase some garments, as his clothes were worn out. He could now enforce obedience from his Indian servant-boy who also had become "well skilled in knitting."

By this time Robert had acquired the language of the country, so that he could explain his wants, and trade and barter with the natives to advantage.

Cheered by all this prosperity he determined to build him a new and better house; and this he did in "a garden of coker-nut trees belonging unto the king, a pleasant situation."

"Being settled in my new house," he continues, "I began to keep hogs and hens; which, by God's blessing, thrived very well with me, and were a great help unto me. I had also a great benefit by living in this garden. For all the coker-nuts that fell down they gave me, which afforded me oil to burn in the lamp, and also to fry my meal in. Which oil, being new, is but little inferior to this country's butter."

All these improvements in his circumstances, however, never detached Robert Knox's thoughts and affections from his native land, to which he was determined to attempt to escape, though he would await the favourable opportunity with prudent patience.

[To be continued.]

GOREDALE.



[Source of the Air.]

The above wood-cut is a representation of one of the most extraordinary scenes of natural magnificence in England. Whitaker, in his History of the Deanery of Craven, informs us that Dr. Pococke, the late Bishop of Meath, the celebrated traveller, "who had seen all that was great and striking in the rocks of Arabia and India, declared that he had never seen any thing comparable to this place." It lies in the West Riding of Yorkshire. The country for many miles around the spot is singularly wild. In the hollow formed by the meeting of two valleys lies the village of Malham (pronounced Maum), forming part of the parish of Kirkby. The village is rural and sequestered, and, except that there is but little wood, presents an aspect of cultivation and fertility, forming a contrast with the savage desolation in the midst of which it is placed. In the uplands, to the north of the village, lies a sheet of water of about a mile in circumference, called Malham Tarn: its banks a bleak waste, but celebrated for its excellent perch and trout. *Tarn* means a small lake, and, according to Wordsworth, is mostly applied to such as are high up in the mountains. At the further termination of the valley which stretches to the west of the village, is a noble natural monument an immense unbroken barricade of limestone, stretching across the chasm, and rising into the air to the height of three hundred feet. The loftiness and long sweep of this prodigious rampart make it impressive beyond all description. It is known by the name of Malham Cove. But the scene to which our present notice refers lies about a mile east from this, at the extremity of the opposite valley. The proper source of the river Air, or Are, which flows in a line nearly parallel to the more celebrated stream of the Wharf, from which it is divided by a mountainous range, till they both fall into the Humber, is Malham Tarn, already mentioned. The outlet, or one of the outlets, of this lake, after flowing tranquilly for a short distance, encounters the stupendous rocky pile of the Goredale; and here its waters used to be detained, without power to make their way either through or over the barrier. It appears to be just about a century ago since the obstacle was first overcome. In a very admirable plate of the cascade, engraved by J. Mason, from a drawing by T. Smith, and published in 1751, it is stated that "the water collected in a sudden thunder-

shower, about eighteen years ago, burst a passage through the rock (where it first appears tumbling through a kind of an arch), and rushed with such violence that it filled the valley below with vast pieces of broken rocks and stones for a quarter of a mile below." Gray, the poet, who visited the spot on the 13th of October, 1769, gives, in a letter to Dr. Warton, the following description of it, part of which has been sometimes copied without acknowledgment by succeeding writers, especially by a Mr. Thomas Hurtley, who, in 1786, published a 'Concise Account of the Natural Curiosities in the Environs of Malham.' "From thence" (the village of Malham), says Gray, "I was to walk a mile over very rough ground, a torrent rattling along on the left hand; on the cliffs above hung a few goats; one of them danced, and scratched an ear with its hind foot in a place where I would not have stood stock-still

'For all beneath the moon.'

As I advanced the crags seemed to close in, but discovered a narrow entrance turning to the left between them: I followed my guide a few paces, and the hills opened again into no large space; and then all further way is barred by a stream, that, at the height of about fifty feet, gushes from a hole in the rock, and spreading in large sheets over its broken front, dashes from steep to steep, and then ripples away in a torrent down the valley; the rock on the left rises perpendicular, with stubbed yew-trees and shrubs staring from its side, to the height of at least three hundred feet; but these are not the thing; it is the rock on the right, under which you stand to see the fall, that forms the principal horror of the place. From its very base it begins to slope forwards over you in one block or solid mass, without any crevice in its surface, and overshadows half the area below with its dreadful canopy: when I stood at (I believe) four yards distance from its foot, the drops, which perpetually distil from its brow, fell on my head; and in one part of its top, more exposed to the weather, there are loose stones that hang in air, and threaten visibly some idle spectator with instant destruction. It is safer to shelter yourself close to its bottom, and trust to the mercy of that enormous mass which nothing but an earthquake can stir. The gloomy uncomfortable day well suited the savage aspect of the place, and made it still more formidable. I stayed there, not without shuddering, a quarter of an hour, and thought my trouble richly paid; for the impression will last for life. At the alehouse where I dined in Malham, Vivares, the landscape-painter, had lodged for a week or more; Smith and Bellers had also been there, and two prints of Goredale have been engraved by them."

Our cut is taken from an original sketch. There is a print of the same scene in Whitaker's History of the Deanery of Craven; and another in Mr. Hurtley's book, engraved by W. Skelton, from a drawing by A. Devis. According to this writer, the arch from which the water issues is 150 feet above the ground. The summit of the right-hand rock, he says, is 240 feet from its base, which it overhangs by about 20 yards. In Smith's print it seems to incline at an angle of about 45 degrees. Above the visible top of this cliff there are, according to Hurtley, three other rows of receding rocks, fronting a similar pile on the opposite side, between which if a line were drawn across, its height above the rivulet would exceed 900 feet. If this account be correct, the view above the cascade is probably as magnificent as that from below.

The goats, according to Whitaker, which used to be seen by the shuddering visitor browsing on the points of this airy precipice, have been for some time banished. It was probably found that they destroyed the yew-trees and other green plants. The region above, however, still more utterly inaccessible to man, is still, we presume, the haunt of the ravens and eagles, whose screams, mingling with the dash of the waters, have been described as heightening so greatly the terrific dreariness of the scene.

SIMPLIFICATIONS OF ARITHMETICAL RULES.

No. 5.

We now intend to show how to find the circumference of a circle, of which we know the diameter; or, in common language, knowing the greatest width across of a perfectly round space, to find how far it is round. We may premise, that if one circle be twice or three times as wide as another, it is twice or three times as long round: thus, if one circle be 10 feet in width, in which case it will be about $31\frac{1}{2}$ feet round, a second circle of 20 feet wide will be twice $31\frac{1}{2}$ feet, or 63 feet round, nearly. In the following rule we have two processes: the first finds the answer nearly; the second corrects the answer first found, and gives a result considerably nearer the truth. The two together are sufficient for any practical purpose.

Previously to giving the rule, we will show those who do not understand decimal fractions, how to defer all fractions to the end of the process. If we want to find the circumference of a circle whose diameter is 18 feet, we cannot do this very exactly without fractions. But if we take a circle of 18,000 feet in diameter, we may safely avoid fractions; because a whole foot is only the eighteen thousandth part of our new diameter, whereas it would have been as much as the eighteenth part of our former one. And the second diameter being 1000 times too great, the circumference obtained will also be 1000 times too great; that is, the thousandth part of the result is the thing we want. The practical rule is: annex ciphers to the given diameter until there are at least five places of figures in it.

We have a circle of 586 feet in diameter, of which we wish to know the circumference. Annex *two* ciphers, or multiply by 100, which gives 58600. Multiply by 11 and by 2, and divide by 7; as follows:—

```
    58600
       11
   ------
   644600
        2
   ------
7)1289200
   ------
   184171  rem. 3, which neglect.
```

Cut off *two* places, and our first answer is 1841 feet and $\frac{71}{100}$ of a foot, which is not far from the truth. So far the process is the one which would have been followed by Archimedes. To bring this nearer the truth, first write down the number just obtained,

184171.

Multiply this by 4, beginning at the fourth figure from the right, which in this case happens to be 4. Do not put down the units from this figure, but only carry the tens, that is, the *nearest ten*. Thus, 4 times 4 is 16, the nearest ten is two tens, or 20; carry *two*. Four times 8 is 32, and 2 is 34; and so on. Subtract the product just obtained from the preceding, as follows:—

```
184171
    74
------
184097
```

Cut off two places as before, and the result is 1840 feet and $\frac{97}{100}$ of a foot. This is within $\frac{1}{100}$ of a foot of the truth.

As another example, what is the circumference of the circle whose diameter is 33215 yards?

33215
11
365365
2
7)730730
104390
42
104348

No ciphers were annexed, hence the circumference is 104348 yards nearly. This is within a yard of the truth; that is, the error is not as much as one part out of one hundred thousand of the whole.

For the reverse rule, to find the diameter when we know the circumference, proceed as follows:—If there be not five places of figures, annex ciphers to make up five places; multiply by 4, beginning from the fourth place (as was done just now), but *add* instead of *subtracting*; multiply the result by 7, and divide by 11 and by 2. For example: a circle is 1043 feet round; what is its diameter? Annex one cipher to make up five places, giving 10430; multiply by 4, beginning at the fourth figure (0) from the right, but only using this to carry from, which gives simply 4. The rest of the process needs no explanation, and the whole is as follows:—

10430 } add.
4
10434
7
11)73038
2)6640 most nearly. See No. 4.
3320

As we annexed one cipher, cut off one place from this, which gives 332 feet, which is within $\frac{1}{10}$ of a foot of the truth, or within about $\frac{1}{3000}$ part of the whole.

As another example, what is the diameter of the circle whose circumference is 47903 miles?

47903 } add.
19
47922
7
11)335454
2)30496 most nearly.
15248

As no ciphers were annexed, the answer is 15248 miles. This is within much less than a mile of the truth.

To find the *area* of a circle, or the number of *square* feet or miles, &c. as the case may be, which are contained within its circumference, multiply the diameter by itself, and divide by 4, or multiply half the diameter by itself. Proceed with this result exactly as in the first of the two rules already given. For example: how many square inches are there in the circle whose diameter is 34 inches? The half of 34 is 17, which, multiplied by itself, gives 289. The process is as follows:—

28900
11
317900
2
7)635800
90829 most nearly.
36 subtract.
90793

Two ciphers were annexed, and the answer is 907 square inches, and $\frac{93}{100}$ of a square inch, very nearly.

LINNÆUS.

The 23d of May is the birth-day of the celebrated Charles von Linné, or Linnæus, as he is generally called in this country, the prince of modern botanists. He was born, as he himself informs us, at the small village of Rashult, in the parish of Stenbrohult, in the province of Smaland, Sweden, in the year 1707. His ancestors were humble peasants; but his father, after struggling through many difficulties, had qualified himself to enter the church, and at the time of the birth of Charles, who was his eldest child, held the cure of the parish of Stenbrohult. He was very fond of botany, and had a large collection of rare and foreign plants in his garden, in which he spent much of his time, and where Charles, almost as soon as he had left his cradle, was his constant companion. It was in this way, no doubt, that he was first led to the love of the science, which he was destined so greatly to adorn. "But his bent," to quote his own words, "was first decidedly displayed on the following occasion. He was scarcely four years old when he accompanied his father to a feast at Mökler; and in the evening, it being a very pleasant season of the year, the guests seated themselves on some flowery turf, listening to the pastor, who made various remarks on the names and properties of the plants, showing them the roots of the *Succisa*, *Tormentilla*, *Orchides*, &c. The child paid the most uninterrupted attention to all he saw and heard, and from that hour never ceased harassing his father about the name, qualities, and nature of every plant he met with; indeed he very often asked more than his father was able to answer, but, like other children, he used immediately to forget what he had learned, and especially the *names* of plants. Hence the father was sometimes put out of humour, and refused to answer him, unless he would promise to remember what was told him. Nor had this harshness any bad effect, for he afterwards retained with ease whatever he heard." When Linnæus was ten years old he was sent to school at Wexio, to be educated for the church; and here and at the gymnasium of the same place he continued for eight or nine years. During all this time, however, he confesses that he made very little progress in the studies to which he was chiefly expected to attend; in mathematical and physical science he was superior to most of his schoolfellows, but in literature and the languages he made little or no progress. The bent of his mind was so strong in one direction that every thing but his favourite pursuits appeared indifferent to him—the peculiarity of all enthusiasts, and the chief source both of their weakness and of their strength. Whenever he could escape from the school, he was off to gather botanical specimens in the fields and woods. The consequence of all this was that in 1726, when his father came to bring him home from the gymnasium with the intention of sending him to the university, he received such an account of him from the masters, that he gave up all thought of educating him for the church, and determined to bind him apprentice to some mechanical occupation. He had in fact made up his mind to article him to a shoemaker or tailor, when he fortunately happened to call upon a Dr. Rothmann, a physician in the town. He mentioned his intentions with regard to his son, and the vexation his conduct had occasioned him. Rothmann took a more considerate, and as it turned out, a much truer view of the case, than either the young man's masters or his father had done. It was pretty evident, he acknowledged, that Charles was not likely to become a luminary of the church; but it did not follow from that that he might not succeed in a more congenial profession. In short, the benevolent physician ended the conversation by proposing to the clergyman to take his son into his own house, if he would permit him to continue his studies, not in divinity, but in medicine. Such an offer, which, besides other valuable advantages, promised so much to lighten the

expense of the young man's education, was not to be rejected. Next year, Linnæus proceeded to the University of Lund. We must not, however, omit the amusing, and as he calls it himself, "not very creditable certificate" with which he was dismissed by the head-master of the gymnasium: "Youth at school," it said, "may be compared to shrubs in a garden, which will sometimes, though rarely, elude all the care of the gardener, but if transplanted into a different soil, may become fruitful trees. With this view, therefore, and no other, the bearer is sent to the university, where it is possible that he may meet with a climate propitious to his progress." But Linnæus, by the favour of a friend, found means to get his name enrolled in the classes, without showing this document, the horticultural style of which at any rate, was so appropriate to the subject. At Lund he was taken into the house of Stobæus, one of the medical professors, who was charmed with the botanical knowledge he found him to possess; and he derived particular advantage from the extensive library belonging to this gentleman, often sitting up all night to peruse the books which he borrowed from it. Next year, however, he determined to leave this comfortable retreat for the University of Upsala, where he thought he would enjoy superior advantages. All the assistance that his parents could give him for this project amounted to a sum of about eight pounds, and with this he set out. "But in a short time," as he tells us, "he found his pocket quite empty, no chance of obtaining private pupils (who in fact are seldom put under the care of medical students), nor any other means of obtaining a livelihood. He was obliged to trust to chance for a meal, and, in the article of dress was driven to such shifts that he was obliged, when his shoes required mending, to patch them with folded paper, instead of sending them to the cobbler." Here also, however, his talents and acquirements at last recommended him to a protector, the eminent professor Celsius, who took him into his own house, as Rothmann and Stobæus had done before. It was while at Upsala, about the close of the year 1729, that his thoughts were first turned to the new views upon which he has founded his celebrated system of vegetable nature, by the perusal of a review of Vaillant's Treatise on the sexes of plants in the Leipsic Commentaries. Soon after he put a sketch of his system into the hands of Rudbeck, the professor of botany; and that gentleman was so much struck with its novelty and ingenuity that he immediately formed an intimate acquaintance with the author, and eventually employed him as his assistant in lecturing. This was the first escape which Linnæus made from obscurity into any thing like public notice; but he had still a long course of difficulties to contend with. Meanwhile he was making himself known over all Europe by a rapid succession of publications illustrative of his new views in natural history. That study was becoming more and more every year a passion which absorbed his whole mind. In 1736 he visited England, where he is said to have been so enchanted by the golden bloom of the furze in the neighbourhood of London, and especially on Putney heath, that he fell on his knees in a rapture of delight at the sight. At last, about the year 1739, he took up his residence as a practising physician at Stockholm. In 1741 he was appointed professor of medicine at Upsala, and from this time he may be considered as having been on the fair road to fame and fortune. The 'Species Plantarum,' his great work, in which his system was first fully developed, appeared in 1753, in two volumes, which, however, in the last edition, have been extended to ten. In 1758 he was created by the King of Sweden a Knight of the distinguished order of the Polar Star, and in 1761 was ennobled. After many literary labours, which we have not space to enumerate, and accumulating a respectable fortune, this great naturalist died at his estate of Hammarby, near Upsala, on the 11th of January, 1778, in the seventy-first year of his age. At the conclusion of a very curious Diary kept by him, which has been published, he gives us an account of his own character and habits at great length. "He was," he says, "in the highest degree averse from every thing that bore the appearance of pride. He was not luxurious, but lived as temperately as most people. During the winter he slept from nine to seven, but in summer from ten to three. He never deferred doing what was necessary to be done. Every thing he observed he noted down in its proper place immediately, and never trusted it to memory. He always entertained veneration and admiration for his Creator, and endeavoured to trace his science to its author."



[Portrait of Linnæus.]

Protection of Commerce.—The fairs of Botzen are the principal fairs of the Tyrol, for every kind of merchandize, they are held four times in the year, and last a fortnight each time. The fair had begun a few days before I reached Botzen, and I visited it for the first time on the evening of my arrival. There is one very long street in Botzen, with covered arcades on both sides; and it is under these arcades, partly in shops, and partly on stalls, that the fair is held. Every kind of merchandize was exposed. All the goods were Austrian: no manufactures of other nations are admitted; and the protective system is fully acted upon. Whatever may be the wisdom of the measure as regards the Government, individuals suffer by it. I inquired the prices of several of the articles which were exposed; and found that good broad cloth, but not by any means equal to the west of England cloth, or the cloth manufactured at Verviers in the Netherlands, cost eight florins a yard (about 18*s.* 8*d.*); and calicos, very inferior to the English, both in quality and colour—to say nothing of taste,—were at least one half dearer. Other articles were proportionably dear; especially every kind of cutlery, which, I need scarcely say, was of a very inferior quality.—*The Tyrol, by H. D. Inglis.*

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn-Fields.

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TOUCANS.

(Grouped from Le Vaillant's Hist. Nat. des Ois. de Paradis; Rolliers, Toucans, &c. &c.)



1. Aracari Toucan (*R. Aracări*). 2. Red-bellied Toucan (*R. Erythrorynchos*). 3. Toco Toucan (*Ramphastos Toco*). 4. Black and Yellow Toucan (*R. Discolorus*).

THE TOUCAN.

THE preceding wood-cut represents a group of various species of the Toucan,—a bird, as will be perceived, of very remarkable formation. The enormous beak is nearly as long as the body; and this circumstance has given rise to the belief that the toucan is greatly embarrassed by this extraordinary provision of nature, and rendered incapable of those active movements which so peculiarly distinguish the feathered race. If the beak, indeed, were constructed in that solid manner which we ordinarily observe in birds of prey, and in those who live upon hard substances, we should not be surprised to find so considerable an appendage weighing down the unfortunate bird's head, and unfitting it for upward flight, or even for ordinary vision, excepting in one direction. In that case the toucan must have been doomed to a grovelling life upon the earth, perpetually striving to use its brilliant wings, and longing to search for food amongst the high branches of fruit-bearing trees,—but striving and longing in vain. This would not have been in conformity with the usual harmony of nature; and, therefore, in spite of its enormous beak, we find the toucans flying as nimbly as any other bird from tree to tree —perching on the summits of the very highest—searching for fruit with restless activity—pursuing small birds which, it is now ascertained, form part of their food—and defending their young with unremitting vigilance against serpents, monkeys, and other enemies. All these functions of their existence could not have been performed if the specific gravity of the beak were equal to its dimensions. But it is not so. As compared, in specific gravity, with the beak of a hawk for instance, the beak of the toucan may be said to stand in the same relation to it as a piece of pumice-stone to a piece of granite. The exterior of the beak is a spongy tissue, presenting a number of cavities, formed by extremely thin plates, and covered with a hard coat scarcely thicker. This remarkable beak forms almost as curious and wonderful an example of peculiar organization as the trunk of the elephant. We are not so intimately acquainted with its uses; but there can be no doubt that the instrument is admirably adapted to the necessities of the toucan's existence.

The toucans, as well as the aracaris, which they greatly resemble, are found in the warmest parts of South America. Their plumage is brilliant; and their feathers have been employed as ornaments of dress by the ladies of Brazil and Peru. Several specimens have been kept alive in this country. Mr. Broderip, in the Zoological Journal for January 1825, has given an interesting account of a specimen in a small menagerie, whose habits he watched with great care. By this examination the fact was established that the toucan ordinarily feeds on small birds. The toucan in question, upon a goldfinch being put into his cage, would instantly kill it by a squeeze of his bill, and then deliberately pull his prey to pieces, swallowing every portion, not excepting the beak and the legs. Mr. Broderip states that the toucan appeared to derive the greatest satisfaction from the act of eating, which he ascribes to the peculiar sensibility of the internal part of the beak. He never used his foot except to confine his prey on the perch: the beak was the only instrument employed in tearing it to pieces. It appears, also, that this bird subjects some of its food to a second mastication by its beak, in a manner somewhat resembling the similar action in ruminating animals.

BLIND ALICK OF STIRLING.

THERE is still living at Stirling a blind old beggar, known to all the country round by the name of Blind Alick*, who possesses a memory of almost incredible strength.

Alick was blind from his childhood. He was the son of poor parents, who could do little for him; though, indeed, at that time, wealth could not have done much for the education of one labouring under his privations. The admirable system of instructing the blind, and those ingenious contrivances of our days which may almost be said to supply the deficiency of sight, were not yet known. The poor people of Scotland, however, much to their honour, have generally shown an anxiety that their children should receive the first rudiments of education, and have long been accustomed to send them regularly to some humble day-school. To a school of this sort Alick was sent by his parents to keep him out of mischief, and in order that he might learn something by hearing the lessons of the other children. The only volume then used in such establishments as a class or reading-book was the Bible; and it was customary for the scholars, as they read in rotation, to repeat not only the number of each chapter but the number of each verse as it was read. By constantly hearing these readings young Alick soon began to retain many of the passages of scripture, and with them the number of the chapter and verse where they occurred. It is probable, that being incapacitated by his sad privation from any useful employment, he may have remained an unusual length of time at this school; and that his father, as was generally the case with the Scottish peasantry, was a great reader of the Bible at home. A constant attendance at church would also contribute to the result.

However all this may have been, it was observed with astonishment that when Blind Alick was a man, and obliged, by the death of his parents, to gain a livelihood by begging through the streets of his native town of Stirling, he knew the whole of the Bible, both Old and New Testaments, by heart!

This prodigious extent of memory naturally attracted the attention of many persons in good circumstances, and recommended him to the poor Presbyterian townfolk; so that Alick not only had his limited wants very readily supplied, and lived an easy mendicant sort of life, but was looked upon by all as one of the wonders of the place, and was noticed by men of science and learning.

The late Professor Dugald Stewart once expressed an intention of questioning Blind Alick, and examining this phenomenon of the human mind. That acute metaphysician might have elicited some curious facts, but we believe the interview never took place. Many persons of education have, however, examined Alick, and have invariably been astonished at the extent of his memory. You may repeat any passage in scripture, and he will tell you the chapter and verse; or you may tell him the chapter and verse of any part of scripture, and he will repeat to you the passage, word for word. Not long since a gentleman, to puzzle him, read, with a slight verbal alteration, a verse of the Bible. Alick hesitated a moment, and then told where it was to be found, but said it had not been correctly delivered; he then gave it as it stood in the book, correcting the slight error that had been purposely introduced. The gentleman then asked him for the ninetieth verse of the seventh chapter of Numbers. Alick was again puzzled for a moment, but then said hastily, "You are fooling me, sirs! there is no such verse—that chapter has only eighty-nine verses." Several other experiments of the sort were tried upon him with the same success. He has often been questioned the day after any particular sermon or speech; and his examiners have invariably found, that had their patience allowed, Blind Alick would have given them the sermon or the speech over again.

Another extraordinary part of this mendicant's memory is shown in the manner in which he recollects the sounds of voices. A Scotch gentleman, who had formerly frequently amused himself with the old man (Alick has much dry, shrewd humour), but who had not been at Stirling for many years, happened lately to visit that

* A Scotch diminutive for Alexander.

town. He met Alick taking his daily walk and accosted him. "I should know that voice," said the blind man, "but it is not so Scottish as it was—you will have been living among the Englishers." Alick was quite correct: the gentleman had been living for a long time out of Scotland, and had partly lost his vernacular accent.

Blind Alick lives alone, and whenever he quits his humble apartment he locks the door and carries the key with him in his hands. This key, which is old-fashioned, and of rather an extraordinary size, is always in his hands while he is abroad. He is indeed never seen without it, and while talking or answering the questions which are so frequently put to him, he rubs the key backward and forward in his hands, or shifts it from one hand to the other. A curious discovery was accidentally made, that by taking this key from him his memory became confused, and its wonderful current soon stopped.

Several experiments have been made to ascertain this fact, and one recently by the gentleman whose change of accent Alick had detected. He took the key as if to examine it, and continued to interrogate the beggar as to different passages of scripture, &c. Alick's responses came more and more slowly, and then incorrectly, until he entreated the gentleman would return him his key, for he could not command his memory without having it in his hands. From this, ignorant persons have almost been inclined to look upon Blind Alick's key as a talisman, or something magical; though the fact will only suggest to the philosophic mind the force of habit, and the mysterious though natural association existing between our mental faculties and material things and circumstances. In much the same manner an old Italian gentleman (known to the writer of this article), who was remarkable for his conversational powers, was invariably reduced to silence and absence of mind if any person took possession of a particular chair in a particular part of the room which he had been accustomed to occupy for a long series of years. It was in vain to press him with the subjects of conversation in which his heart most delighted, and on which he was habitually most eloquent—there was scarcely a word to be obtained from Don Felix until he was restored to his wonted seat.

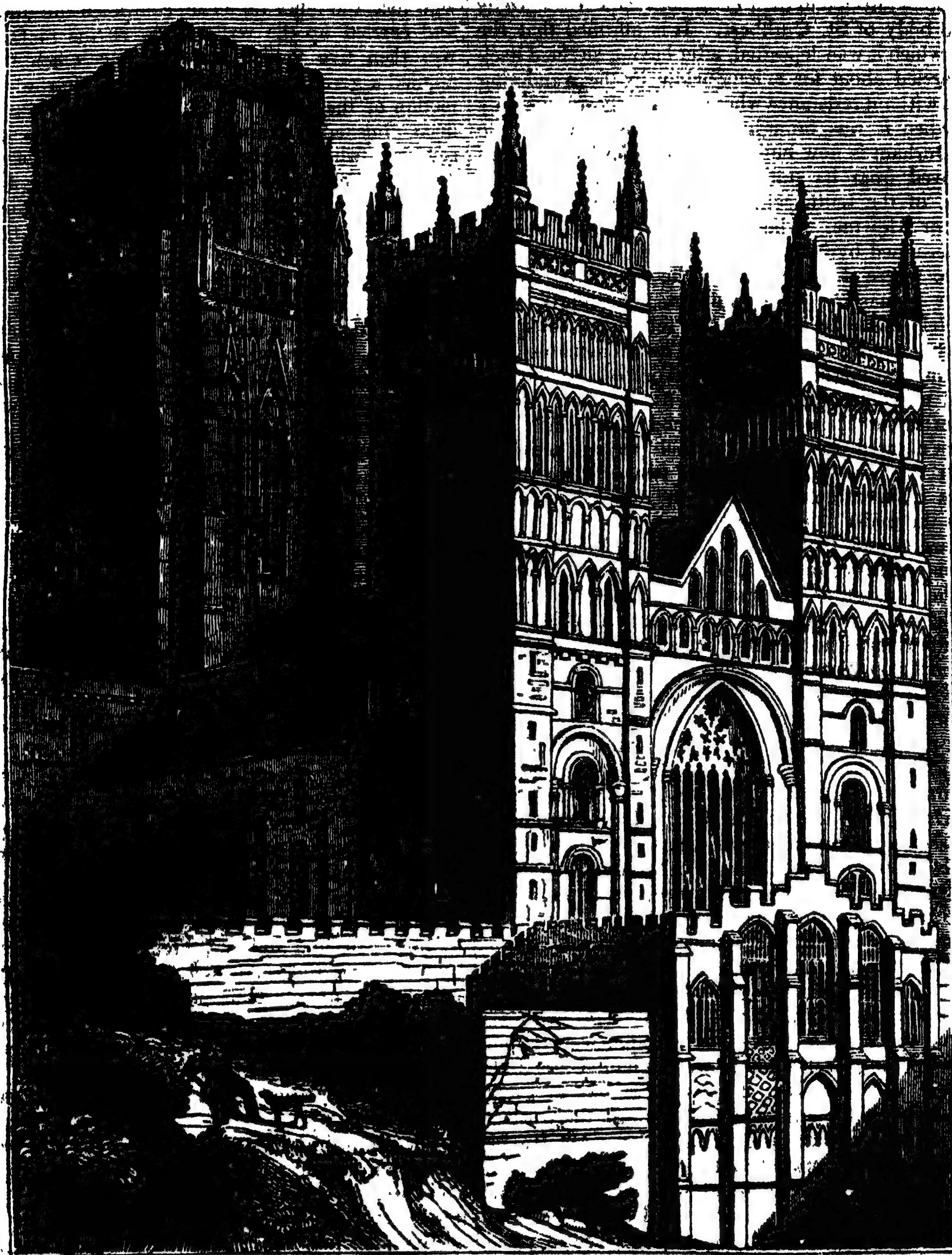
Blind Alick's memory has not only resisted the encroachment of old age, but, what is generally still more destructive to that faculty of the mind, the impairing effect of strong drinks.

Blind as he is, Alick is so well acquainted with every turn and corner, with every ascent and descent in Stirling, that he requires no one to guide him: he dispenses even with the services of a dog, that useful, sagacious, and faithful attendant on the poor blind. His favourite walk is round the precipitous rock on which Stirling Castle is built, where in many places a slight deviation from the path would cause a broken neck or broken limbs. There however he goes, day after day; and on the sunny side of that height the curious traveller is pretty sure to find Blind Alick, with his key in his hand.

Lapland Stockings.—The numerous species of Sedge (called by botanists *Carex*) are applied to a variety of useful purposes. In Herefordshire, for instance, sedge is used for tying young hop-plants to the poles; in Cambridge for lighting fires; and every where for making common chair bottoms. In Lapland, however, it has a much more important office, as will appear from the following passage translated from Linnæus by Mr. Curtis. The great Swedish botanist is speaking of the *Carex acuta*:—"Thou wilt wonder, perhaps, curious reader, in what manner human beings are capable of preserving life during the intense severity of a winter's frost in Lapland, a part of the world deserted on the approach of winter by almost every kind of bird and beast. The inhabitants of this inhospitable climate are obliged to wander with their rein-deer flocks continually in the woods, not only in the day time, but through the longest winter nights; their cattle are never housed, nor do they eat any other food than liver-wort; hence the herdsmen, to secure them from wild beasts and other accidents, are of necessity kept perpetually with them. The darkness of their nights is, in a degree, overcome and rendered more tolerable by the light of the stars reflected from the snow, and the Aurora Borealis, which in a thousand fantastic forms nightly illumines their hemisphere. The cold is intense, sufficient to frighten and drive us foreigners from their happy woods. No part of our bodies is so liable to be destroyed by cold as the extremities, which are situated farthest from the heart; the chilblains of the hands and feet so frequent with us in Sweden sufficiently indicate this. In no part of Lapland do we find the inhabitants affected with chilblains, though, in respect to the country, one would expect them to be peculiarly subject to this disease, especially as they wear no stockings, while we clothe ourselves in one, two, and even three pair.—A Laplander preserves himself from the violence of the cold in the following manner: he wears trousers made of the rough skin of the rein-deer which reach to his ankles, and shoes made of the same material, the hair turned outward; this grass (the *Carex acuta*), cut down in the summer, dried, rubbed betwixt the hands, and afterwards combed and carded, he puts into his shoes, so as not only wholly to enwrap his feet, but the lower part of his legs also, which thus defended never suffer from the severest cold; with this grass he also fills his hairy gloves to preserve his hands: and thus are those hardy people enabled to bear the frost.—As this grass in the winter drives away cold, so in the summer it checks the perspiration of the feet, and preserves them from being injured by stones in travelling, for their shoes are extremely thin, being made of untanned skins. It is difficult to learn on inquiry, what the particular species of grass is which is thus in request with these people, as some use one sort, and some another. It is, however, always a species of Carex, and we understood chiefly this."—The liver-wort mentioned in this quotation is the rein-deer lichen, the *Lichen Rangiferinus* of Linnæus, but now called *Cenomyce Rangiferina*.

American Politeness.—When a female of whatever condition (always alas! provided she has no negro blood in her veins) enters a coach, or packet (in most parts of the United States), or any other conveyance, the universal practice is for the best seat to be resigned to her use; this in a carriage is considered to be the one which enables the traveller to sit with his face to the horses. Mr. Stuart (whose travels we recently noticed), being aware of this custom, but at the same time suffering much from riding backwards, took measures on one occasion for securing himself against the necessity of resigning the seat of honour; by application at the coach-office he obtained a positive promise that the favourite place should be reserved for him, and that he should be left in the undisturbed possession of it. At starting, Mr. Stuart, much to his satisfaction, seated himself according to his bargain, promising himself for once at least a day of comfort on his journey. His felicity, however, was of very short duration. The coachman pulled up in a street near the outskirts of the town, a door opened, and the usual cry of "ladies" from the cad warned our traveller that his newly chartered rights were in danger of being contested. It was in vain that he pleaded his bargain; the whole covenant was declared null and void ab initio; coachman, porters, passengers, and by-standers, all joined in denouncing his claim as abominable and preposterous; the ladies refused to enter the vehicle or even to leave their house until the seat was vacated; and all was uproar and confusion. The landlord of the hotel whence the coach had started, being sent for to decide the dispute, refused to acknowledge the validity of the agreement, into which, considering its extraordinary nature, his book-keeper could have no right to enter without his especial permission; and on Mr. Stuart's continuing to turn a deaf ear to representation, persuasion, remonstrance, and invective, the angry proprietor at length declared that if he persisted in retaining his seat, he might do so, but that he should derive little benefit from his obstinacy; for that he would order the horses to be detached and led off to a spare coach, in which the ladies should have their proper places. As even yet no sign of concession appeared, the threat was actually put in execution; and our traveller finding at length that an individual has but little chance of resisting the united opinion of a whole population, was finally reduced to the necessity of following to the other vehicle amidst the jeers and exulting laughter of the by-standers. Mr. Stuart, who tells the whole story with infinite good-humour, adds that after travelling a few miles he entered into conversation with his fair ejectors, and that the whole party soon became perfectly cordial.

DURHAM CATHEDRAL.



[North-west View of Durham Cathedral.]

The above wood-cut presents a view of this massive and ancient pile. The earliest seat of the bishopric of Durham was the small isle of Lindisfarne, off the coast of Northumberland. Here, in the year 635, Aidan, a monk, brought from Iona by the Northumbrian king Oswald, who had received his education at the court of his relative, Donald IV. of Scotland, fixed his residence, along with the other pious men who were to be his assistants in the work of introducing and diffusing the light of Christianity among the Pagan subjects of the Saxon sovereign. Another monk of Iona, named Corman, had preceded Aidan in the Northumbrian mission; but the severity of his temper, or his repulsive manner, is said to have so greatly impeded his success in conversion, that after a short time he gave up the attempt, and returned to his monastery. The successor of Aidan, who died in 651, and from whom Lindisfarne derived the name of Holy Island, by which it is still known, was Finan, also from the same venerable northern seat of sanctity. His incumbency lasted for ten years, during which he commenced the building of the first church on Lindisfarne, which was, however, merely an edifice of wood, thatched with reeds. Three other Scotch bishops followed, the last of whom, Eata, died in 685. The person next appointed to the see was the renowned St. Cuthbert. This celebrated character only held the office of bishop for two years; but his name has become more intimately associated with the see in history and popular tradition, than any other with which it has ever been connected. He is said to have been originally a shepherd, near Melrose; which condition he was induced to exchange, according to the legend, for that of a monk, by certain miraculous intimations from heaven, which we shall not stop to recount. His devotion and extreme asceticism soon procured him unrivalled celebrity. Not only was he believed to be endowed with supernatural powers while alive; for many ages after his death his mortal relics were regarded as having the property of working miracles. All who have read the early history of the English Church are familiar with the story

of the manner in which the monks of Lindisfarne, driven from their original abode by the ravages of the Danish pirates, were directed in their choice of a new residence by the dead body of St. Cuthbert. It is affirmed that the coffin in which it was deposited, after having suffered itself to be carried about for a long while by the wandering brethren without resistance wherever they chose, suddenly halted when it was brought to the spot on which the city of Durham is now built, and could not by any force be removed from its station. This happened towards the close of the tenth century, in the time of Bishop Aldune, or Aldwine. The extraordinary event was, of course, assumed by him and his brethren to point out the place where it happened as the appointed site of their new monastery. Preparations, accordingly, were immediately made for effecting the settlement thus distinctly commanded by heaven. The miraculous tale was found, as might have been expected, to have a powerful effect in exciting the pious exertions of the neighbouring inhabitants. The wood with which the place was covered was cleared by their fervent activity; and after the persevering labour of two or three years, the spire of a completed Christian temple was seen rising in the midst of the waste.

Obvious as are the traces of fraud and superstition which this narrative presents, it is not the less fitted to add to the interest of the spot where the scene of it is laid. The very grossness of the invention which was successfully resorted to, in order to work upon the minds of the simple population, presents the most vivid picture that could be drawn of the ignorance and thick darkness of the time. The spectre is the most forcible as well as the most picturesque evidence of the gloom. The body of St. Cuthbert has since this date had a curious history; but one much too long for us to detail. The fable was that the clayey tenement of the departed saint remained as unaffected by corruption as when his spirit inhabited it; and this continued to be universally believed down at least to the Reformation. The most decisive confutation, however, which the story has received was given to it only a few years ago by the actual disinterment of the body. The Rev. James Rayne, rector of Meldon, has published a highly interesting account of this discovery in a quarto volume entitled 'Saint Cuthbert; with an account of the state in which his remains were found upon the opening of his tomb, in Durham Cathedral, in the year MDCCCXXVII.' The work is one of great learning and ability, and will well reward the perusal either of the antiquary or the general reader. Mr. Rayne conceives that he has proved that the coffin in which the remains of the saint were found was the very one in which they lay for some centuries at Lindisfarne, and which was afterwards carried about from place to place by the monks in their search after a new residence. It is curious that this is not the only memorial we possess of these remote events. A book is still in the British Museum which is said to have been carried about along with the coffin, and which yet presents some remarkable evidences of its alleged history. Upon this head we can only afford to mention farther that at the late disinterment it was found that a composition, in imitation of the natural appearance, had been substituted for the eyes of the saint, doubtless with the object of supporting the imposture respecting the pretended preservation of his body. His skull, we may add, exhibited the fragments of a nose and chin turned upwards in rather a remarkable manner; and altogether its conformation seems to have been somewhat peculiar, although not of the description that, according to modern doctrines, would indicate any intellectual superiority in its possessor.

The present Cathedral of Durham contains no portion of the church erected by Bishop Aldwine. It was begun in 1093, by one of his successors, William de Carilepho, who had been abbot of St. Vincent the Martyr, in Normandy, and presided over the see of Durham from 1080 till 1095. His immediate successor, Ralph Flambard, who held the office till 1128, continued the undertaking, and carried up the walls as far as the roof. The see was then five years vacant, during which the monks applied a great part of their revenues towards the completion of the work. It appears, however, not to have been finished till about the middle of the thirteenth century, when Nicholas Farnham was bishop, and Thomas Welscome, or Melsonby, or Malsamb, prior of the monastery. Indeed some important additions seem to have been made to it within a few years of the close of the century.

The building therefore presents us with a complete exemplification or history of the progress of ecclesiastical architecture in England during the twelfth and thirteenth centuries. According to the account of it published at the expense of the Antiquarian Society, with the drawings of Mr. Carter, and understood to be written, we believe, by Sir Henry Englefield, it illustrates the successive changes which took place during the reigns of the first three Henries, till by degrees the pointed had completely superseded the circular roof, and the heavy Norman pillars had become polished into the light shafts of the early English. The general character of the edifice, however, is massy and ponderous, only a few of the last finished parts exhibiting the commencement of a lighter style. Some of the more ancient pillars are twenty-three feet in circumference. Within the last half century it has undergone extensive repairs in almost every part; but these unfortunately have not been generally executed in the best taste, nor with sufficient attention to the character of the original building. The south front is the one that preserves its ancient appearance most entire; but it is in great part encumbered and concealed from view by the cloisters, and other extraneous erections. The west front is the richest, and most imposing. Besides the square towers surmounted by pinnacles, which, as usual, crown its extremities, it is adorned by a projecting chapel in the centre, called the Galilee, flanked by buttresses and arches. The Galilee appears to have been repaired and renovated by Cardinal Langley, who was bishop of Durham at the commencement of the fifteenth century, and it is finished accordingly in a much more florid style than the greater part of the cathedral. It is 80 feet in length by 50 in breadth. Over it is a window of large dimensions, but of no remarkable beauty.

The Cathedral of Durham stands on the summit of the mount around which the town is built, and occupies, therefore, a singularly conspicuous and commanding position. Both from its site and its size it far overtops all the other buildings in the midst of which it is placed, and is seen from a great distance rising high above the horizon. It is built in the customary form of a cross; but in addition to the great central transept, which is 170 feet in length, it has smaller cross aisles at both its eastern and western extremities. A richly ornamented tower ascends from the centre of the building to the height of 212 feet; and two others, as already mentioned, of less height and plainer architecture, rise over the western front. The entire cathedral is about 411 feet in length, and about 80 feet in breadth.

The two fronts of which the best view is to be obtained are the north and the west. The former may be seen to great advantage from the spacious square called the Place, or Palace Green, which it overlooks, and on the opposite side of which stands the building called the Castle, which is the bishop's city residence. The west front surmounts a rocky declivity, at the foot of whi[illegible] flows the river Wear; and from the opposite ban[illegible] that stream the façade and its battlemented tow[illegible]erable themselves with full effect, and in all th[illegible] grandeur.

OLD TRAVELLERS.—No. 2.

ROBERT KNOX—*continued.*

BESIDES the men taken with Robert Knox and his father, there was another party of Englishmen detained prisoners in Ceylon. These men, thirteen in number, belonged to a ship (the Persia Merchant) that had been wrecked upon the Maldive islands, whence they had escaped in boats to a part of the coast held by the Cingalese, who immediately seized them and carried them up the country. They had been prisoners eighteen months at the time Knox and his party were detained. Two of them had imprudently entered the service of the King of Kandy. These were very young men, named Hugh Smart, and Henry Man. They lived within the court and obtained great favour, being always about the sovereign's person. They could not, however, forget their own country, and when a Dutch ambassador came up to Kandy from the coast, Hugh Smart contrived to steal to him and ask news concerning England. This was a capital offence in Cingalese law, "for," says Robert Knox, "the king allows none whatever to come to the speech of *Ambassadours*, much less one that served in his presence, and heard and saw all that passed in court." Had a Cingalese committed the offence, he certainly would have died, but the tyrant was merciful to this English youth, and merely sent him farther up the mountains, where Hugh took a native wife who bore him a son. He afterwards came to an accidental death.

Henry Man who retained the dangerous favour of the king, and who was promoted to be "chief over all the king's servants that attended on him in his palace," met with a much more wretched end. He had the mischance to break one of the tyrant's china dishes, on which, being sore afraid, he ran for sanctuary to a Cingalese temple. The king not wishing to take him by force from the priests, induced him by a kind message to return to the court. But no sooner did the unfortunate Henry come forth, than men, acting by the king's orders, seized him and bound his arms behind him, above the elbows. "In which manner he lay all that night, being bound so hard that his arms swelled, and the ropes cut through the flesh into the bones. The next day the king commanded a nobleman to loose the ropes off his arms, and put chains on his legs, and keep him in his house, and there feed him and cure him. Thus he lay some six months, and was cured, but had no strength in his arms, and then was taken into office again, and had as much favour from the king as before."

A short time after this, Henry was detected in a correspondence with a Portuguese;—this sealed his doom. With the Portuguese who had written the letter, and a third individual who had been privy to it, he was bound and cast out of the palace, when they were all three "at one time and in one place torn in pieces by elephants," who were the principal executioners in Ceylon.

This alarming intelligence soon reached Robert Knox and the rest of the English, but at the same time the tyrant sent special orders to the people among whom they were settled that they should all be kindly treated.

When four years of captivity had expired, Robert entertained very strong hopes of an immediate delivery. Sir Edward Winter, Governor of Fort Saint George, contrived to remit a letter to the King of Kandy, in behalf of the prisoners; and at the same time a Dutch ambassador from Colombo used his mediation in their favour. Knox, and all those who had been taken with him, were ordered up to the capital which was then at Nillemby, where they met the crew of the "Persia Merchant" whom they had not hitherto seen. They were in all twenty-seven Englishmen. A few days after their arrival they were summoned to court, and there assured by some of the nobles that it was his majesty's pleasure to grant them all their liberty, and to let them depart for their own country. It appears, however, that there was never any sincerity in these assurances. "For in the next place," says Knox, "they told us, it was the king's pleasure to let us understand, that all those who were willing to stay and serve his majesty, should have very great rewards, as towns, monies, slaves, and places of honour conferred upon them; which we all in general refused."

Shortly after this the Englishmen were examined privately, one by one, as to their willingness to stay, and the arts and crafts they were in possession of. What the king most wanted were artisans and trumpeters. Every man stood firm in declining the honours offered, and in preferring to go to his native country; "by which," says Knox, "we purchased the king's displeasure."

How matters might have ended, appears to have been extremely doubtful; but while they were waiting about the court, a part of the Cingalese people, who had too long borne the tyrant's cruelty, broke out into sudden rebellion and forced him to fly to the mountains. At first the insurgents had thought of murdering all the English, as they might prove formidable if they joined the king; but notions more favourable to them at length prevailed, and when the tyrant had fled, the sailors were permitted to ransack the houses of those who departed with him,—a permission of which they availed themselves without any scruple of conscience, and "found good prey and plunder."

The rebels then marched on to Kandy, where the king's son, a boy of fifteen, whom they intended to proclaim in his father's stead, was then residing. The English sailors went with them as friends and allies. On Christmas-day, "of all the days in the year!" exclaims Robert, they were summoned to the palace, and presented by the leaders of the insurgents with money and clothes, to induce them to bear arms against the old king, which they were willing enough to do. But lo! just at this crisis the young prince and his aunt escaped from the rebels! "which so amazed and discouraged them," says Knox, "that the money and clothes which they were distributing to us and other strangers, they scattered about the court and fled themselves. And now followed nothing but cutting one another's throats to make themselves appear the more loyal subjects, and make amends for their former rebellion." The Englishmen scrambled with the rest for the money that was strewed about, "being in great necessity and want;" and having got as much of it as they could, they retreated from the hurly-burly to their own lodgings, wisely intending "neither to meddle nor make on one side or the other, being well satisfied, if God would permit them, quietly to sit, and eat such a Christmas dinner together as he had prepared for them."

The restored tyrant took a tyrant's vengeance on his subjects;—his sword devoured on every side; yet, though they were sorely alarmed, he did not touch so much as a hair of the Englishmen's heads, being willing to believe that they had joined the rebels by force and had only plundered through want, as he was not there to give them rice. He, however, left them for two months to shift for themselves, during which time they begged by the road's side. They were then sent back to different parts of the country as before: not another word was said about their release; but the Cingalese among whom they were to sojourn, were commanded to supply them gratis with provisions, and treat them kindly.

The place where Robert Knox was quartered was much nearer to the sea than his former residence; and this circumstance prolonged the hope, which he never abandoned, of escaping from the island. To ensure his comfort, however, in the mean time, he built himself another house "upon the bank of a river, and intrenched it round with a ditch, and planted a hedge; and so began to settle; and followed the business of knitting and going about the countries a trading." As none of

them had escaped, the English captives were gradually allowed more liberty. The capital with which he began his manufactures of caps this second time was only about seven shillings, yet from this humble beginning, with industry and thrift, he became at the end of two years a man of considerable substance, for that country. He was rich in betel-nuts, a staple and valuable commodity of Ceylon. The natives, seeing his prosperity and orderly conduct, were very pressing that he should take a young wife from among them; "it would be an ease and help to him," they said, knowing that he cooked his own victuals, as he had turned away his black boy to seek his fortune, when at the capital, "and it was not convenient for a young man like him to live so solitarily alone in a house." But Robert resisted all these temptations, as he felt that such an alliance might detach his thoughts from England and tie him to Ceylon.

At the end of two years the Dutch penetrated inland, and built a fort not far from Robert's residence. On learning this the king ordered that he should be removed immediately; and so sudden and arbitrary was this removal, that he was obliged to leave all his wealth behind him and could scarcely save his clothes.

He was conveyed to a dismal town called Laggendenny, a place of exile for such as incurred the king's displeasure, situated on the top of a lofty mountain. Here also state prisoners were frequently sent for secret assassination. This change, from "the sweet and pleasant country below," was indeed a sad one; his solitude was, however, cheered by the company of his "dear friend and fellow-prisoner, and fellow-bachelor, Mr. John Loveland" (who had been supercargo of his father's ship), with whom he lived very amicably in the same house.

By this time Knox and Loveland were almost the only single men among the English captives, for the mass of the others despairing of liberty "had built them houses, and taken them wives, by whom they had many children." The behaviour of these men, who had not Robert's degree of education and religious feeling, was far from being exemplary; they addicted themselves to arrack, an ardent spirit made in Ceylon from sweet juice extracted from the unexpanded flower of the cocoa-nut tree; they stole cows to procure themselves beef; they domineered over, and not unfrequently beat the poor peasants among whom they were quartered, and who seem to have been a mild, inoffensive people. The life of these rude mariners, apart from their forcible detention, was certainly not a hard one; for rice and some other provisions they paid nothing; they could cultivate the ground and knit caps without hinderance or tax of any kind; and now, provided they did not approach the sea-coast, they were at liberty to range over the rest of the island, which they did as pedlars.

After some time Knox contrived to descend from his mountain abode at Laggendenny to his former fair house, near the river, and there obtained payment of a few of his many out-standing debts, with which small capital he began the world again for the third time; and for a third time he prospered. As his wealth increased he became desirous of buying a fine piece of land, and having consulted a Cingalese, high in authority, touching the legality of his making such a purchase, and not finding any impediment, he bought the said land. "This place also," says Robert, "liked me wondrous well; it being a point of land, standing into a corn-field, so that corn-fields were on three sides of it, and just before my door a little corn-ground belonging thereto, and very well watered. In the ground, besides eight coker-nut trees, there were all sorts of fruit trees the island afforded. But it had been so long desolate, that it was all overgrown with bushes, and no sign of a house therein. The price of this land was five and twenty larees, that is, five dollars (*about one pound sterling*), a great sum of money in the account of this country."

The place was called Elledat, and lay some ten miles to the south of the city of Kandy. Knox proceeded forthwith to build another house here, in which he was assisted by three Englishmen who were settled in the neighbourhood, and who either had not married or had quitted their native wives, being all at that time single men. When his new house was finished, and the grounds well cultivated, Robert proposed that the three Englishmen should live and share the produce of the estate with him, only pledging themselves to remain single men. This covenant which he says he thought fit to make "to exclude women from coming in, to prevent all strife and dissension," was formally agreed to; and for two years they lived amicably together, not an ill word passing between them. At the end of the second year, however, two of them, wearied of their condition, took wives, on which they were excluded the community. Robert now remained at Elledat with only one companion—Stephen Rutland, who never left him. "We lived solitarily and contentedly," he says, "being well settled in a house of my own. Now also we fell to breeding up goats: we began with two, but by the blessing of God they soon came to a good many; and their flesh served us instead of mutton. We kept hens and hogs also; and seeing no sudden likelihood of liberty, we went about to make all things handsome and convenient about us."

In course of time Robert and his comrade Stephen so improved the house and ground, that few noblemen's seats in the land excelled them. They defended their entrances by two great thorn gates after the fashion of the country, and built also another house in the yard "all open for air" to receive the visits of their Cingalese neighbours.

Knox, who decidedly had a commercial turn, on perceiving that "the trade of knitting was grown dead," as so many hands had overstocked the market with cotton caps, and that he could not extend his agricultural operations without women (having excluded them from his little republic), who, in Ceylon, perform the greater part of the labours of husbandry, resolved to take up another trade in use among the Cingalese. "This trade," to give his own description of it, "was to lend out corn; the benefit of which *is fifty per cent. per annum.* This I saw to be the easiest and most profitable way of living, whereupon I took in hand to follow it; and what stock I had, I converted into corn or rice in the husk. And now as customers came for corn, I let them have it, to receive at their next harvest, when their own corn was ripe, the same quantity I lent them, and half as much more. But as the profit is great, so is the trouble of getting it in also. For he that useth this trade must watch when the debtor's field is ripe, and claim his due in time, otherwise other creditors coming before will seize all upon the account of their debts, and leave no corn at all for those that come later." This circumstance affords a curious illustration of the difficulty of carrying on agricultural operations in a country with little capital, where the cultivators are too poor to wait from the seed-time to the harvest.

All this while Knox had been receiving his rice and other daily provisions from the poor Cingalese, who at last refused to furnish them any longer, saying that he was better able to live without their donation than they to give it him. Knox, who appears to have become avaricious, is obliged to allow that this was perfectly true; but he says he did not think fit to lose that portion of allowance, which the king was pleased to allot him. This would have been very well, had his supplies of rice, &c. been made at the expense of the king; but hitherto the burden had fallen entirely on the oppressed and impoverished peasantry, and Robert would have done well to wave so odious a right long before. He still, however, insisted on his daily allowance, and went to court to plead for it. His right was readily admitted;

but the great man intrusted with these matters, *at last*, taking into consideration the poverty of the people among whom Knox dwelt, gave him a ticket which entitled him to go every month to court, and receive his supplies from the king's own storehouses. He was well-nigh paying dear for his greediness: his frequent appearance at court drew on him the attention of the great men, who determined that he should be taken into the king's service,—a service which, from the cruelty of the tyrant, was almost sure to terminate in a dreadful death, and which would have rendered impossible that escape from the country on which Robert and his friend Stephen were still bent. With great address and difficulty he escaped this court promotion, and returned to his house at Elledat, too happy to sacrifice for the future his allowance of rice.

He now renewed his peddling trade on a much grander scale, both as related to the goods he dealt in, and to the extent of country he travelled through. He bought a quantity of pepper, tobacco, garlic, combs, and iron-ware of different sorts, and loaded with these, and selling them as they went along, he and Stephen Rutland ventured far to the north of the island. All this was done to learn their way to the coast through this most difficult country, where there were few or no paths, complicated forests, wild ravines, and jealous guards of Cingalese soldiers at every pass of ingress or egress. The northern side was preferred by them, as it was supposed to present somewhat less difficulty than any other direction.

The low country to which they directed their steps was subject to drought, and the very worst species of disease, arising from standing waters. They were obliged to drink fetid water, so thick and muddy, that the very filth would hang to their beards; and year after year they returned thence to Elledat with violent fevers and agues, "insomuch," says Robert, "that our countrymen and neighbours used to ask us if we went thither purposing to destroy ourselves, they little thinking, and we not daring to tell them, our intent and design."

[To be continued.]

THE ITALIAN WOLF-DOG.



[Italian Wolf-Dogs.]

In No. 62 we gave an account of the shepherds of the Abruzzi, and of the powerful and courageous race of dogs that are employed there to defend the flocks against the attacks of wolves. In the Zoological Gardens there are specimens of this species of dog. They are of beautiful form, something lighter than the Newfoundland dog, but strong and muscular. Their fine long hair is white. In the above cut we have given portraits of these noble animals.

She-Goats.—I believe the best method of rearing children, when their mothers cannot nurse them, is by allowing them to suck a domesticated animal. I know a fine healthy young lady, now about seventeen years of age, who was thus reared. A goat is the best animal for this purpose, being easily domesticated, very docile, and disposed to an attachment for its foster child: the animal lies down, and the child soon knows it well, and, when able, makes great efforts to creep away to it and suck. Abroad the goat is much used for this purpose; the inhabitants of some villages take in children to nurse; the goats, when called, trot away to the house; and each one goes to its child who sucks with eagerness, and the children thrive amazingly.—*Gooch's Lectures.*

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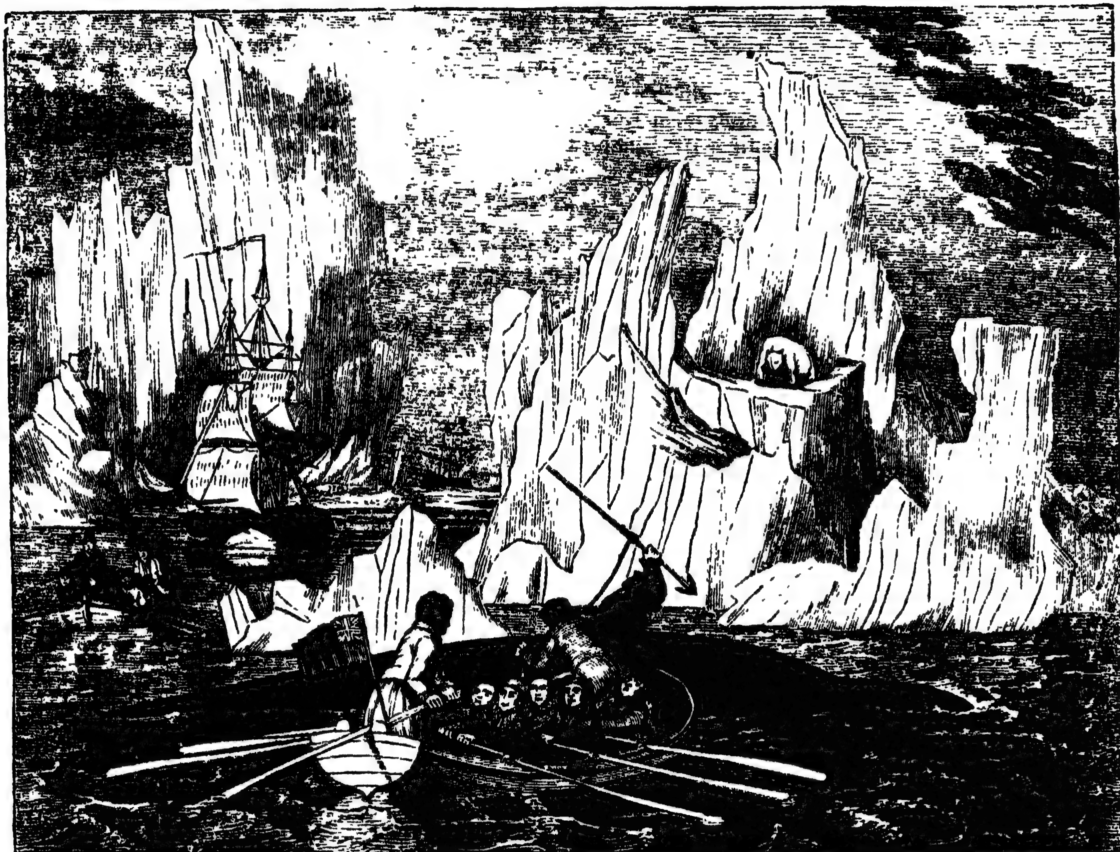
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THE WHALE FISHERY.



[Harpooning the Whale in the Arctic Seas.]

The animal popularly known by the name of the whale is, at least in its more remarkable varieties, not only what Milton calls the Leviathan in one passage,—that sea-beast

> ——— "which God of all his works
> Created hugest that swim the ocean stream;"—

but the "hugest of living creatures," as the same poet elsewhere describes the monster mentioned in scripture, thus giving it the precedence over even "Behemoth, biggest born of earth." There is no reason to imagine that any creature ever trod the land approaching to the magnitude of this sovereign of the deep. The common Greenland whale (*Balæna mysticetus*) is not unusually 58 or 60 feet in length, by 30 or 40 in circumference. This implies a weight of about seventy tons, being equal to that of two hundred fat oxen. The love of the marvellous, not satisfied with these enormous dimensions, has indeed propagated stories of whales of much larger size. Many naturalists have spoken of such as had attained their full growth measuring sometimes 150 or 200 feet; and some of the older writers assure us, that specimens have been seen of above 900 feet in length: but these statements are, undoubtedly, wild and ignorant exaggerations. Referring to the *Balæna mysticetus*, Captain Scoresby informs us, that of three hundred and twenty-two individuals, in the capture of which he had been personally concerned, no one, he believes, exceeded 60 feet in length. A few instances may have occurred in which eight or ten feet more had been attained; but there is no evidence that the animal was ever seen of a greater length than 70 feet. Sixty feet is the length commonly assigned to it even by the older writers, when they speak from their own observation.

There is, however, another variety, the *Balæna physalis* of Linnæus, or that known by the name of *Razor-back* among the whalers, which reaches a larger size, being sometimes found 100 or 105 feet long. "It is probably," as Captain Scoresby remarks, "the most powerful and bulky of created beings." The Razor-back, however, which derives its name from a small horny protuberance or fin running along the ridge of the back, is no great favourite with the whale-fishers, being both more active and difficult to capture than the common or what they call the *right fish*, and very far from being so valuable a prize when obtained.

In the present state of zoological information naturalists have been only able to determine two species of whale, that of the north, and that of the south. These species were for a long time confounded; and their differences were first pointed out by M. Delalande.

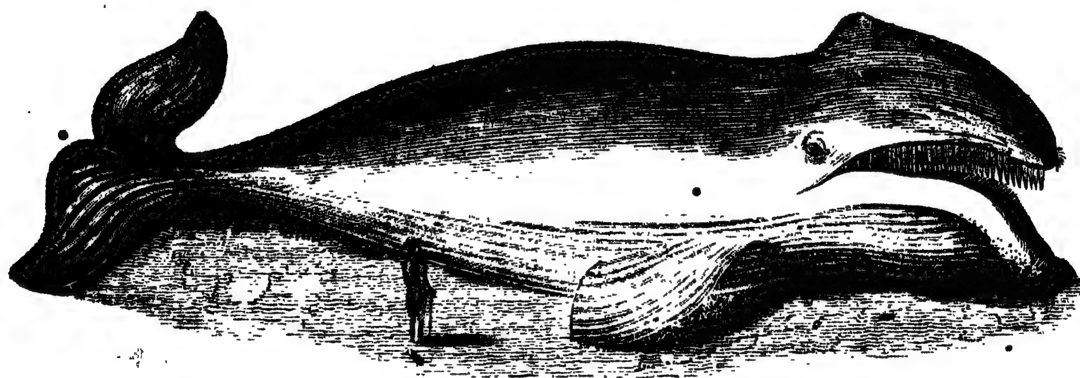
These distinctions are not sufficiently important to be noticed here. The following description of the northern or Greenland whale will apply to the southern, in all essential points. The Asiatic and African elephants are each in the same manner remarkable for such differences of structure, particularly in the form of the head, which are sufficient to constitute distinct species.

The whale is popularly considered as a fish; but, except that it lives in the water, it has little or no similarity to the class of animals properly so designated. It is viviparous, that is to say, it brings forth its young, not enclosed in an egg, but alive and full formed; it has usually but one at a time, which it suckles with milk drawn from its teats. It is therefore considered as belonging to the class of the Mammals, the same under which man is comprehended. It is, also, like man, a warm-blooded animal; the blood, however, being of considerably higher temperature than in the human species. Finally, it is provided, like the human being, with lungs, and can only breathe by putting its head out of the water.

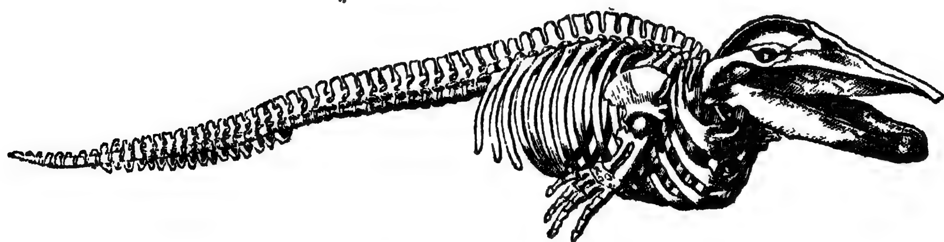
The skin of the whale is dark-coloured, smooth, and without scales. Its form in the middle part is cylindrical, from which it gradually tapers towards the tail. This part of the animal is usually only five or six feet in length; but its width, or extent from right to left, its position being horizontal, or flat upon the water, is sometimes twenty-five or twenty-six feet. The power of this bony fan, as we shall have occasion more particularly to notice in the sequel, is prodigious. It is the instrument by which the animal principally makes its way through the water, and also its most effective weapon of defence. Towards the head it likewise possesses two fins, or swimming paws, as they have been termed, attached to the under part of the belly; but the chief use of these seems to be to balance it, or keep it steady, as it moves along. About a third part of its whole length is occupied by its enormous head, which is cleft in two by a mouth, the opening of which extends to the neck. The head of the whale is the most peculiar and remarkable part of its structure. The species we are now describing, although it has both upper and lower jaws of porous bone, has no teeth, but in their room two fringes, as they may be called, consisting each of a series of blades of an elastic substance covered on their interior edges with hair, attached to the upper gum. This is the substance known by the name of whalebone. The blades are broadest at their upper extremity, where they are inserted in the gum, and are of greatest length in the middle of the series or row on each side of the mouth. The greatest length varies from ten to fifteen feet; and the breadth at the gum is usually, in a full-grown fish, from ten to twelve inches. There are upwards of three hundred blades in each series, or side of bone, as the whale-fishers term it. The use of this part of its structure to the animal is to serve as a net or sieve in which to collect its food. As it proceeds with distended jaws through the ocean, the water rushes through this sieve; but even the minutest living creatures are detained by it, and are made, in so many successive accumulations, to form mouthful after mouthful to the mighty destroyer.

The eyes of the whale are placed almost immediately above the corners of the mouth. They are singularly disproportionate to the size of the animal, being scarcely larger than those of an ox. No trace of an ear is to be discerned till after the removal of the skin; and the hearing of the whale is accordingly very imperfect. On the most elevated part of the head are the nostrils or blow-holes, being two longitudinal apertures of six or eight inches in length. Through these, when the creature breathes, a jet of moist vapour is snorted forth to the height of eighteen or twenty feet, and with a noise which may sometimes be heard at the distance of several miles.

The open mouth of a whale is a capacious cavern, capable of containing a ship's jolly-boat full of men. Captain Scoresby describes its dimensions as being commonly six or eight feet wide, ten or twelve feet high in front, and fifteen or sixteen feet long. The throat, however, is very narrow.



[Carcass of the Whale.]



[Skeleton of the Whale.]

Such then is the enormous creature upon which man has undertaken to make war, undeterred by a disparity of size, strength, and all the elements of natural power. The whale fishery affords the most extraordinary exemplification of how inadequate is the mightiest endowment of mere brute force to cope with the resources of art. Even the immense bulk and energies of the animal itself, that

——————" on the deep
Stretched like a promontory sleeps or swims,
And seems a moving land,"

constitute the least formidable among the terrors of this field of adventure. The desolate and inclement region, which is the scene of enterprise, encompasses the pursuit with its worst hardships and dangers. In this realm of eternal winter, man finds the land, the sea, and the air equally inhospitable. Every thing fights against him. The intensest cold benumbs his flesh and joints; while fogs or driving sleet often darken the sky, and at the same time arm the frost with a keener tooth. The ocean over which he moves, besides its ordinary perils, is crowded with new and strange horrors. Sometimes the ice lies extended in fixed beds that bar all navigation as effectually as would a wall of iron, and over whose rugged and broken surface he can only make his way by leaping from point to point, at the risk of being ingulfed at every step. Sometimes it bears down upon him in vast floating fields with such an impetus that, at the shock, the strong timbers of his ship crack and give way like an eggshell, or are crushed and ground to fragments between two meeting masses. Sometimes it rises before him in the shape of a lofty mountain, which the least change in the relative weights of the portion above and that beneath the surface of the water may bring in sudden ruin upon his head, burying crew and vessel beneath the tumbling chaos, or striking them far into the abyss. And as for what may be dimly distinguished to be land, rimming with its precipitous coasts these dreary waters, it may be most fitly described in the lines in which the poet has pictured one of the regions of the nether world:—

> "Beyond this flood, a frozen continent
> Lies dark and wild, beat with perpetual storms
> Of whirlwind and dire hail, which on firm land
> Thaws not, but gathers heap, and ruin seems
> Of ancient pile; or else deep snow and ice."

Almost the only vegetation that springs from this frost-bound soil is a scanty verdure, formed of mosses, lichens, and other low plants, that conceal themselves beneath the snow. At the farthest limit to which adventure has pierced, a night of four months' duration closes each dismal year; throughout which human life has indeed been sustained by individuals previously inured to a severe climate, but the horrors of which have, in most of the instances in which the dreadful experiment has been either voluntarily or involuntarily tried by the natives of more temperate regions, only driven the wretched sufferers through a succession of the intensest bodily and mental tortures, and then laid them at rest in the sleep of death.

From the narrative of the voyage of Ohthere the Dane, given by King Alfred, in his Saxon translation of Orosius, it would appear that the pursuit of the whale was practised by the people of Norway at least as early as the ninth century. Other northern authorities bear testimony to the same fact. Of the manner, however, in which the whale fishery was carried on at this remote era we know nothing. It probably was not pursued on any systematic plan, but merely in the way of occasional encounters, as the hunting of wild animals on land would be practised in the same state of society. The inhabitants of the coast surrounding the Bay of Biscay seem to have been the first who engaged in whale fishing with a view to commercial purposes. They are therefore properly to be considered the originators of the pursuit as a branch of national enterprise. Their prosecution of it in the adjacent seas can be traced back as far as the twelfth century. The animal against which they directed their attacks, however, was most probably of a different species from that found in the northern ocean, and of a much smaller size. It seems to have been captured principally, if not exclusively, for the sake of its flesh, which was in those days esteemed as an article of food, the tongue especially being accounted a great delicacy.

By degrees, however, the number of whales that resorted to the Bay of Biscay diminished, and at length the fish altogether ceased to visit that sea. In these circumstances the Biscayan mariners carried the navigation farther and farther from their own shores, till at last they approached the coasts of Iceland, Greenland, and Newfoundland. Thus was commenced, in the course of the sixteenth century, the northern whale fishery, as pursued in modern times.

The earliest whaling voyage made by the English appears to have taken place in the year 1594. The merchants of Hull are recorded to have fitted out ships for the fishery in 1598; and much about the same time the Dutch engaged in the trade. The Hamburghers, the French, and the Danes quickly followed. At first both in England and Holland the business was carried on by companies which had obtained charters for its exclusive prosecution. At length, however, it was thrown open in both countries to individual enterprise, under which new system it was found to be conducted with much more success and profit. The Dutch monopoly was put an end to in 1642; the English not till long afterwards. In this country, indeed, the trade was in the hands of an exclusive company till about a century ago. Up to that date it had in general been attended only with loss to each successive association that engaged in it.

In 1732 parliament first adopted the plan of attempting to encourage and establish the trade, by giving a bounty to every ship which should engage in it. The bounty was at first twenty shillings a ton; but it was raised in 1749 to double that rate, upon which, says a late writer, "a number of ships were fitted out, as much certainly in the intention of catching the bounty, as of catching fish." The bounty, which was afterwards reduced to thirty shillings, again raised to its former amount, and subsequently reduced first to thirty shillings, then to twenty-five shillings, and after that to twenty shillings, was at last altogether withdrawn in 1824. The trade is at present, therefore, carried on without any artificial support. The Americans, Hamburghers, and Prussians are now almost the only competitors with whom the English whalers have to contend. The French revolution, and the wars by which it was followed, drove both France and Holland from the field; and neither of these countries have succeeded in the attempts they have made since the peace, to re-enter upon a line of enterprise, their pursuit of which had been so long interrupted.

Having thus hastily glanced at the past history and progress of the fishery, we may now transfer ourselves to the scene of actual operations, and accompany the bold and hardy adventurers in some of their labours and dangers.

The whale ships, which are for the most part vessels of from three hundred to four hundred tons burden, commonly leave this country in time to reach Shetland, where they complete their ballast and lay in part of their stock by about the 1st of April, and to get thence to the ice, so as to commence fishing about the middle or in the latter part of May. Of late years, however, the season, which used formerly to terminate in July, has been occasionally somewhat extended both at its commencement and its close,—fish being now frequently sought for with success as early as April, and as late as September, and even October. The place in which the fishing is chiefly carried on has also been changed within these few years. So recently as 1820, when Captain Scoresby's book was published, the greater number of ships still resorted to the part of the Arctic Ocean on the east coast of Greenland; but that sea is now almost, if not entirely deserted, having been, in fact, nearly exhausted of its fish, just as the Bay of Biscay was some centuries ago. Almost all the ships now proceed directly through Davis' Straits to the great inland sea,

called Baffin's Bay, on the other side of Greenland, the more northern portion of which, and the outlets from it, were for the first time explored, in the course of the late voyages made with a view to the discovery of a north-west passage to India. In these high latitudes whales still exist in large numbers; but from the greater prevalence of ice-mountains or ice-bergs, as they are called, the fishery in Baffin's Bay is probably still more perilous than that was which used to be carried on in the animal's more ancient haunt.

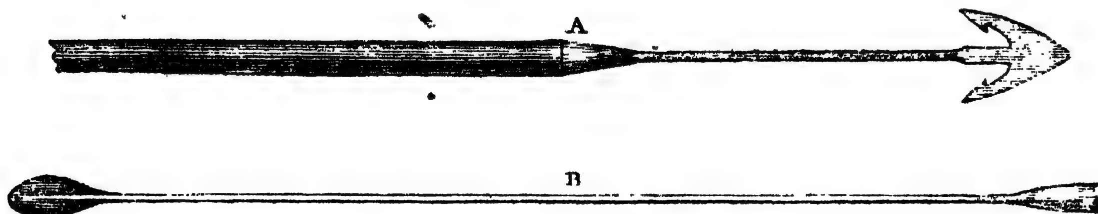
The whale trade has also been gradually shifting from the ports in this country which formerly enjoyed the greatest share of it. Up to about the year 1790, London continued to send out four times the number of ships that sailed from any other place. Even in 1820 the capital still had seventeen or eighteen vessels engaged in the trade. At present we believe this number is reduced to one, or two at most. Liverpool, in like manner, after having for some time carried on the trade to a considerable extent, has now entirely relinquished it. Whitby, also, which sixty or seventy years ago was largely engaged in it, now sends out only one or two ships. Hull is now the principal whale-fishing port in Britain, and has been so since the commencement of the present century. In 1830 that town sent out thirty-three ships. Peterhead, on the east coast of Scotland, ranks next to Hull, having that year sent out thirteen ships. Next to them are Aberdeen, Dundee, Leith, and Kirkaldy. In Peterhead, and most of the other Scotch ports, the trade is on the increase.

The whale, as we have already noticed, appears to have been pursued at first chiefly for the sake of its flesh. Afterwards the highly elastic substance, described before, with which its jaws are lined, formed one of the principal commercial objects on account of which it was valued. "How the ladies' stays were made," gravely observes Anderson, the historian of commerce, "before this commodious material was found out, does not appear; it is probable that slit pieces of cane, or of some tough and pliant wood, might have been in use before." However this may be, whalebone after its introduction speedily came to be the material universally employed in the fabrication of stays, and also of the hoop-petticoat, which came into fashion about the beginning of the last century; that "seven-fold fence," as Pope calls it—

"Stiff with hoops and armed with ribs of whale."

So great was the consumption of the article thus occasioned that for some time the Dutch are stated to have drawn for it from England £100,000 per annum. Its price was then £700 per ton, which is about four times as much as it now commonly brings, and more than eight times what it brought only a few years ago. But the part of the whale which gives the chief value to the fish is what is called its *blubber*, being the substance from which train oil is obtained. This substance, which is really the fat of the animal, lies immediately under the skin, encompassing the whole body, fins, and tail. "Its colour," says Captain Scoresby, "is yellowish-white, yellow, or red. In the very young animal it is always yellowish-white. In some old animals it resembles the colour of the salmon. It swims in water. Its thickness all round the body is eight, or ten, or twenty inches, varying in different parts as well as in different individuals. The lips are composed almost entirely of blubber, and yield from one to two tons of pure oil each. The tongue is chiefly composed of a soft kind of fat, that affords less oil than any other blubber. . . . The blubber, in its fresh state, is without any unpleasant smell; and it is not until after the termination of the voyage, when the cargo is unstowed, that a Greenland ship becomes disagreeable." The price of oil has varied during the last twenty years from £25 to £60 per ton; but of late has not usually exceeded £30.

A Greenland ship, besides a master and surgeon, generally carries a crew of forty or fifty men, comprising several classes of officers, such as harpooners, boat-steerers, line-managers, carpenters, coopers, &c. She is commonly provided with six or seven boats, which, as affording the principal means by which the fishery is to be carried on, are hung round her in such a manner as to admit of being detached and launched with the greatest possible expedition. After the whale is killed and cut up, the bone and blubber are stowed in the ship; but the attack upon the animal and all the operations of its capture and destruction are carried on in the boats. The chief instruments with which every boat is provided are two harpoons and six or eight lances. These weapons are represented in the wood-cut below. The harpoon is made wholly of iron, and is about three feet in length. It consists of a shank with a barbed head, each barb, or wither, as it is called, having an inner and smaller barb in a reverse position. This instrument is attached by the shank to a line or rope of about two inches and a quarter in circumference, and 120 fathoms in length. Each boat is furnished with six of these lines, making in all 720 fathoms, or 4320 feet. The use of the harpoon, which is commonly projected from the hand, but sometimes from a sort of gun, is merely to strike and hook the fish. It is by the lance that its destruction is accomplished. This is a spear of the length of six feet, consisting principally of a stock or handle of fir fitted with a steel head, which is made very thin and exceedingly sharp. The lance is not flung from the hand like the harpoon, but held fast as it is thrust into the body of the animal.



A. The Harpoon. B. The Lance.

We will now quote a few passages from Captain Scoresby's animated description of the process of the capture and slaughter. "Whenever a whale lies on the surface of the water, unconscious of the approach of its enemies, the hardy fisher rows directly upon it, and an instant before the boat touches it, buries his harpoon in its back. . . . The wounded whale, in the surprise and agony of the moment, makes a convulsive effort to escape. Then is the moment of danger. The boat is subjected to the most violent blows from its head, or its fins, but particularly from its ponderous tail, which sometimes sweeps the air with such tremendous fury that both boat and men are exposed to one common destruction." The whale on being struck immediately dives down into the water with great velocity. It appears, from the line which it draws out, that it goes down at the rate of eight or ten miles an hour. "The moment," continues Captain Scoresby, "that the wounded whale disappears,

or leaves the boat, a jack or flag, elevated on a staff, is displayed, on sight of which, those on watch in the ship give the alarm, by stamping on the deck, accompanied by a simultaneous and continued shout of 'a fall.' (This seems to be a Dutch term, meaning a jump or leap.) At the sound of this the sleeping crew are roused, jump from their beds, rush upon deck, with their clothes tied by a string in their hands, and crowd into the boats. With a temperature at zero, should a *fall* occur, the crew would appear upon deck, shielded only by their drawers, stockings, and shirts, or other habiliments in which they sleep. . . . The alarm of 'a fall' has a singular effect on the feelings of a sleeping person, unaccustomed to the whale-fishing business. It has often been mistaken as a cry of distress. A landsman, in a Hull ship, seeing the crew, on an occasion of a fall, rush upon deck, with their clothes in their hands, and leap into the boats, when there was no appearance of danger, thought the men were all mad." In other cases, the author states, the extraordinary noise and tumult has excited the apprehension that the ship was sinking "A recent instance," says the writer of an account of the Northern Whale Fishery, in the first volume of the Edinburgh Cabinet Library, "has even been mentioned to us, in which the panic was so extreme that it was speedily followed by death."

The rapidity with which the line is drawn out by the whale, occasions so much friction as it passes over the edge of the boat as frequently to envelope the harpooner in smoke; and it is only by pouring water upon the wood that it is prevented from catching fire. Frequently also the whole line in the first boat is run out before another has arrived. When this result seems approaching, the crew raise first one oar, then a second, a third, and sometimes even a fourth, in proportion to the degree of the exigence. If the line at any time runs foul and cannot be instantly cleared, it will draw the boat under water, on which the only chance the crew often have of saving their lives, is to catch hold each of an oar and to leap into the sea. The utmost care is requisite on the part of every person in the boat to avoid being entangled in the line as it is drawn out. Scoresby mentions an instance in which a man having chanced to slip his foot through a coil, the line drew him forward to the boat's stern, and then snapped off his foot by the ankle. The following is another anecdote which he gives. "A harpooner belonging to the Henrietta of Whitby, when engaged in lancing a whale into which he had previously struck a harpoon, incautiously cast a little line under his feet that he had just hauled into his boat, after it had been drawn out by the fish. A painful stroke of his lance induced the whale to dart suddenly downward, his line began to run out from beneath his feet, and in an instant caught him by a turn round his body. He had but just time to cry out 'Clear away the line'—'O dear!' when he was almost cut asunder, dragged overboard, and never seen afterwards. The line was cut at the moment, but without avail."

The fish generally remains about half an hour, but sometimes a good deal longer, under water, after being struck; and then, it often rises at a considerable distance from the spot from which it had made its descent. "Immediately that it re-appears," continues Captain Scoresby, "the assisting boats make for the place with their utmost speed, and as they reach it, each harpooner plunges his harpoon into its back, to the amount of three, four, or more, according to the size of the whale and the nature of the situation. Most frequently, however, it descends for a few minutes after receiving the second harpoon, and obliges the other boats to await its return to the surface, before any further attack can be made. It is afterwards actively plied with lances, which are thrust into its body, aiming at its vitals. At length, when exhausted by numerous wounds and the loss of blood which flows from the huge animal in copious streams, it indicates the approach of its dissolution by discharging from its blow-holes a mixture of blood along with the air and mucus which it usually expires, and finally jets of blood alone. The sea to a great extent around is dyed with its blood, and the ice, boats, and men are sometimes drenched with the same. Its track is likewise marked by a broad pellicle of oil, which exudes from its wounds, and appears on the surface of the sea. Its final capture is sometimes preceded by a convulsive and energetic struggle, in which its tail, reared, whirled, and violently jerked in the air, resounds to the distance of miles. In dying, it turns on its back or on its side; which joyful circumstance is announced by the capturers with the striking of their flags, accompanied with three lively huzzas!"

The exhaustion which the whale exhibits on returning to the surface after its first plunge is to be attributed to the immense pressure it has sustained from the water at the great depth to which it had descended. At the depth of 800 fathoms, as Captain Scoresby calculates, this pressure must be equal to 211,200 tons. "This," he remarks, "is a degree of pressure of which we can have but an imperfect conception. It may assist our comprehension, however, to be informed that it exceeds in weight sixty of the largest ships of the British Navy, when manned, provisioned, and fitted for a six months' cruise."

A whale has been sometimes captured and killed in little more than a quarter of an hour—and instances on the other hand have occurred in which the contest has lasted for forty or fifty hours. The average time occupied in favourable circumstances, according to Scoresby, may be stated at about an hour. The general average may probably be two or three hours. But it not unfrequently happens that after the exertions of many hours the fish makes its escape and is lost. Our author relates an extraordinary case of a whale struck on the 25th of June, 1812, by one of the harpooners belonging to the Resolution of Whitby, then under his command, which after a long chase broke off, and took with it a boat and twenty-eight lines, the united length of which was 6,720 yards, or upwards of three English miles and three-quarters. The value of the property thus lost was above one hundred and fifty pounds sterling; and the weight of the lines above thirty-five hundred-weight. They soon after, however, again got sight of the animal near two miles off, and immediately re engaged in the pursuit. They came up with it by great exertions about nine miles from the place where it was first struck. The attack was now renewed. "One of the harpooners," continues Captain Scoresby, "made a blunder; the fish saw the boat, took the alarm, and again fled. I now supposed it would be seen no more; nevertheless we chased nearly a mile in the direction I imagined it had taken, and placed the boats, to the best of my judgment, in the most advantageous situations. In this case we were extremely fortunate. The fish rose near one of the boats, and was immediately harpooned. In a few minutes two more harpoons entered its back, and lances were plied against it with vigour and success. Exhausted by its amazing exertions to escape, it yielded itself at length to its fate, received the piercing wounds of the lances without resistance, and finally died without a struggle. Thus terminated with success, an attack upon a whale, which exhibited the most uncommon determination to escape from its pursuers, seconded by the most amazing strength, of any individual whose capture I ever witnessed. After all it may seem surprising that it was not a particularly large individual; the largest lamina of whalebone only measuring nine feet six inches, while those affording twelve feet *bone* are not uncommon. The quantity of line withdrawn from the different boats engaged in the capture was singularly great. It

amounted altogether to 10,440 yards, or nearly six English miles. Of these thirteen new lines were lost, together with the sunken boat, the harpoon connecting them to the fish having dropt out before the whale was killed." There had been eight boats in all engaged in this extraordinary chase.

Of the dangers sometimes occasioned by the resistance of the whale, or its efforts to retaliate upon its assailants, Captain Scoresby relates various instances. It has happened that the harpooner has been struck dead in an instant by a blow from the animal's tail. At other times the stroke has fallen upon the boat and jerked the crew out of it into the water. "A large whale," says our author, "harpooned from a boat belonging to the same ship (the Resolution of Whitby) became the subject of a general chase on the 23d of June, 1809. Being myself in the first boat which approached the fish, I struck my harpoon at arm's length, by which we fortunately evaded a blow that appeared to be aimed at the boat. Another boat then advanced, and another harpoon was struck; but not with the same result; for the stroke was immediately returned by a tremendous blow from the fish's tail. The boat was sunk by the shock, and at the same time whirled round with such velocity, that the boat-steerer was precipitated into the water, on the side next to the fish, and was accidentally carried down to a considerable depth by its tail. After a minute or so he arose to the surface of the water and was taken up along with his companions into my boat. A similar attack was made on the next boat which came up; but the harpooner being warned of the prior conduct of the fish, used such precautions, that the blow, though equal in strength, took effect only in an inferior degree. The boat was slightly stove. The activity and skill of the lancers soon overcame this designing whale, accomplished its capture, and added its produce to the cargo of the ship."

Such intentional mischief, Captain Scoresby remarks, on the part of a whale as seems to have been displayed in this instance, is not frequent. It is probable, indeed, that nothing properly deserving the name of an intention to inflict injury can justly be attributed to the animal in any circumstances; these violent movements are merely the convulsions either of agony, or of trepidation and intense fear. With all its enormous physical strength the whale is singularly gentle and harmless—so remarkably so indeed that it has been characterized by those who have had the best opportunities of observing it as a stupid animal. It would require better proof, however, we think, than the mere absence of ferocity to make out this conclusion. There are some circumstances which would rather seem to show that the creature is possessed of considerable sagacity. It exhibits the usual instinctive sense of danger when it perceives the approach of its natural enemy, man; and, both before and after it has been struck with the harpoon, it most commonly adopts the very best expedients open to it to give itself a chance of escape. If a field of ice be near, for instance, it makes for the water under it, whither it cannot be followed by the boat; and even when it tries to release itself merely by a precipitate plunge downwards into the sea, it would be difficult to say how it could act more wisely with a view to snap the line to which it has got attached. If the effort were not met on the part of the crew in the boat with the most energetic application of those various resources of art, dexterity, and decision, which are peculiarly at the command of man, it would probably be in every case successful. If it be the fact, also, as is asserted, that the whales of the North Seas have abandoned certain parts of their original domain, which are more accessible to the fishing-vessels, and retired to other situations which are more difficult of approach; this would seem to imply, not only something of reflection and contrivance in individuals, but almost the possession of a power in the species to transmit the results of experience from one generation to another. But be this as it may, if the whale should not be allowed to be a very intellectual animal, its affections, at least, towards its own kind, appear to be deep-seated and strong. The fishers, indeed, are in the habit of taking advantage of the love of the old whale for its offspring, to entice it into their snares; and the artifice often succeeds when, probably, no other would. The cub, though of little value in itself, is struck, to induce the mother to come to its assistance. "In this case," says Captain Scoresby, "she joins it at the surface of the water, whenever it has occasion to rise for respiration; encourages it to swim off; assists its flight, by taking it under her fin; and seldom deserts it while life remains. She is then dangerous to approach; but affords frequent opportunities for attack. She loses all regard for her own safety, in anxiety for the preservation of her young;—dashes through the midst of her enemies;—despises the danger that threatens her;—and even voluntarily remains with her offspring, after various attacks on herself from the harpoons of the fishers. In June 1811, one of my harpooners struck a sucker, with the hope of its leading to the capture of the mother. Presently she arose close by the 'fast-boat;' and seizing the young one, dragged about a hundred fathoms of line out of the boat with remarkable force and velocity. Again she arose to the surface; darted furiously to and fro: frequently stopped short, or suddenly changed her direction, and gave every possible intimation of extreme agony. For a length of time she continued thus to act, though closely pursued by the boats; and, inspired with courage and resolution by her concern for her offspring, seemed regardless of the danger which surrounded her. At length, one of the boats approached so near, that a harpoon was hove at her. It hit, but did not attach itself. A second harpoon was struck; this also failed to penetrate: but a third was more effectual, and held. Still she did not attempt to escape, but allowed other boats to approach; so that, in a few minutes, three more harpoons were fastened; and, in the course of an hour afterwards, she was killed."

In some instances, the boat, instead of being struck into the water, has met with the equally alarming fate of being projected by a stroke of the powerful animal's head or tail into the air. The following remarkable instance of this is given by Captain Scoresby.

"Captain Lyons, of the Raith of Leith," says our author, "while prosecuting the whale fishery on the Labrador coast, in the season of 1802, discovered a large whale at a short distance from the ship. Four boats were despatched in pursuit; and two of them succeeded in approaching it so closely together, that two harpoons were struck at the same moment. The fish descended a few fathoms in the direction of another of the boats, which was on the advance, rose accidentally beneath it, struck it with its head, and threw the boat, men, and apparatus about fifteen feet into the air. It was inverted by the stroke, and fell into the water with its keel upwards. All the people were picked up alive by the fourth boat, which was just at hand, excepting one man, who, having got entangled in the boat, fell beneath it, and was unfortunately drowned. The fish was afterwards killed." The wood-cut in page 208 is copied from an engraved sketch of this singular accident, which Scoresby has given after an original drawing by James Waddel, Esq.

In the early days of the whale fishery, when the fish were found in great numbers immediately around the shores of Spitzbergen, the Dutch formed a settlement on that island, and performed there all the operations of preparing the bone and extracting the oil from the blubber. To so flourishing an extent was the fishery at this

time (the latter part of the seventeenth century) carried on by that nation, that they actually erected a village on this desolate coast, all the houses of which were brought ready prepared from Holland. They gave it the name of *Smeerenberg* (from *Smeeren*, to melt). "This," says Mr. Macculloch, "was the grand rendezvous of the Dutch whale ships, and was amply provided with boilers, tanks, and every sort of apparatus required for preparing the oil and the bone. But this was not all. The whale fleets were attended by a number of provision ships, the cargoes of which were landed at Smeerenberg; which abounded during the busy season with well-furnished ships, good inns, &c., so that many of the conveniences and enjoyments of Amsterdam were found within eleven degrees of the pole! It is particularly mentioned, that the sailors and others were every morning supplied with what a Dutchman regards as a very great luxury—*hot rolls* for breakfast. Batavia and Smeerenberg were founded nearly at the same period, and it was for a considerable time doubted whether the latter was not the most important establishment."

When the whales, however, at length entirely abandoned this neighbourhood, and were not to be found within a distance of about two thousand miles, Smeerenberg was deserted. The exact spot where it stood is now a matter of doubt. Since then the only operation performed upon the whale in its native region after its capture, has been the process called *flensing*, that is, the clearing the carcass of its bone and blubber. This is effected by bringing the dead animal alongside the ship, and, after it has been secured there, sending down the men upon it, having their feet secured with spurs, to prevent them from slipping, who by means of knives and other proper instruments cut off the blubber in slips. After one side has been cleared there is a contrivance for turning the fish over upon the other. The blubber is received from the flensers by the boat-steerers and line-managers, who, after dividing it into smaller pieces, hand it over to two men called *kangs*, by whom it is finally deposited in the ship's hold. While this process is going on, various birds of prey attend in great numbers, and bears and sharks are also at no great distance, ready to fall upon the remainder of the carcass before it sinks into the deep. The operation of flensing is commonly performed by British fishers in about four hours. Even this part of the business, although the struggle with the living animal is now over, is far from being without its perils. "Flensing in a swell," says Captain Scoresby, "is a most difficult and dangerous undertaking; and when the swell is at all considerable, it is commonly impracticable. No ropes or blocks are capable of bearing the jerk of the sea. The harpooners are annoyed by the surf, and repeatedly drenched in water; and are likewise subject to be wounded by the breaking of ropes or hooks of tackles, and even by strokes from each other's knives. Hence accidents in this kind of flensing, in particular, are not uncommon. The harpooners not unfrequently fall into the fish's mouth, when it is exposed by the removal of a surface of blubber; where they might easily be drowned, but for the prompt assistance which is always at hand. Some years ago I was witness of a circumstance, in which a harpooner was exposed to the most imminent risk of his life, at the conclusion of a flensing process, by a very curious accident. This harpooner stood on one of the jawbones of the fish, with a boat by his side. In this situation, while he was in the act of cutting the kreng (the skeleton) adrift, a boy inadvertently struck the point of the boat-hook, with which he usually held the boat, through the ring of the harpooner's spur; and, in the same act, seized the jawbone of the fish with the hook of the same instrument. Before this was discovered, the kreng was set at liberty, and began instantly to sink. The harpooner then threw himself towards the boat; but being firmly entangled by the foot, he fell into the water. Providentially, he caught the gunwale of the boat with his hands; but, overpowered by the force of the sinking kreng, he was on the point of relinquishing his grasp, when some of his companions got hold of his hands, while others threw a rope round his body. The carcass of the fish was now suspended entirely by the poor fellow's body, which was, consequently, so dreadfully extended, that there was some danger of his being drawn asunder. But such was his terror of being taken under water, and not indeed without cause, for he could never have risen again, that notwithstanding the excruciating pain he suffered, he constantly cried out to his companions to 'haul away the rope.' He remained in this dreadful state until means were adopted for hooking the kreng with a grapnel, and drawing it back to the surface of the water. His escape was singularly providential: for, had he not caught hold of the boat as he was sinking, and met with such prompt assistance, he must infallibly have perished."

Our space will not permit us to pursue this part of our subject to greater length, or to enter upon any details respecting the terrible dangers and sufferings which the frequenters of those inhospitable seas have often encountered when the ice, closing in upon them, or dashing their ships in pieces, has left them no place even of temporary refuge, except on its own rugged surface, and apparently shut them out from all the chances of ultimate deliverance. The annals of the whale fishery abound in such narratives; many of which are of absorbing interest.

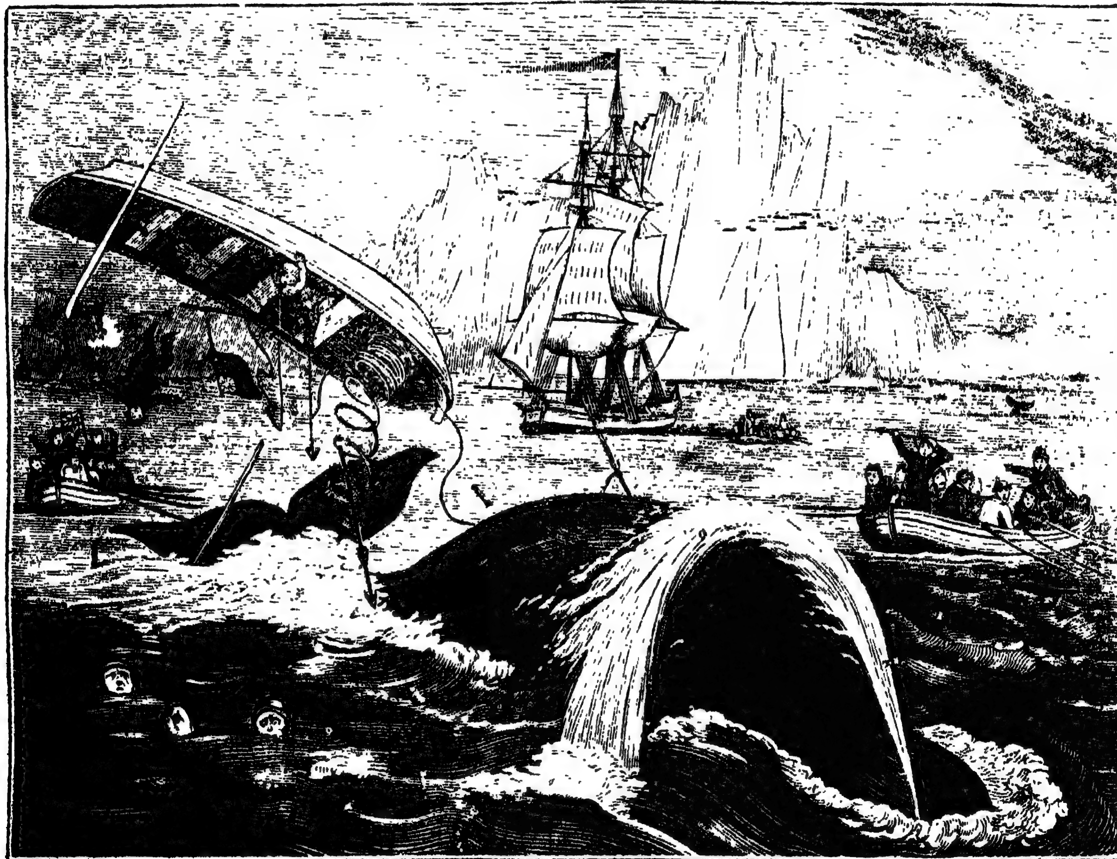
We shall conclude with a few notices of the present state and prospects of the British whale fishery, considered in a commercial point of view. For the particulars we are about to mention we are principally indebted to Mr. Macculloch's Dictionary of Commerce, and to the volume we have already mentioned of the Edinburgh Cabinet Library, the third edition of which, published not many months ago, contains, we believe, the latest account of the fishery that has yet appeared.

According to Captain Scoresby, the average quantity of shipping fitted out for this trade for the nine years ending with 1818, in all the English ports, namely Hull, London, Whitby, Newcastle, Liverpool, Berwick, Grimsby, and Lynn, was 91⅘ vessels; and in the Scotch ports, namely, Aberdeen, Leith, Dundee, Peterhead, Montrose, Banff, Greenock, Kirkaldy, and Kirkwall, 40⅓. In 1830 the former quantity had diminished to 41; while the latter had only increased to 50. Upon the whole therefore there has been a falling off in the course of twelve years to the extent of about 30 per cent. The season of 1830 was one of the most disastrous ever known since the commencement of the fishery. Of the ninety-one vessels which sailed nineteen were entirely lost; as many more returned clean, or without a single fish; seventeen brought only one fish each; and of the others many had only two or three. The actual loss incurred from the shipwrecks, and the severe injuries sustained by twelve other vessels, is calculated to have amounted to about £143,000. Both oil and whalebone immediately rose to more than double their former price; but still the whole produce of the fishery of this year did not amount, according to the highest estimate, to more than £155,565; while that of 1829 was reckoned at £376,150. The season of 1831 was also unfortunate, though not to the same extent; three of the vessels having suffered shipwreck. The produce as compared with that of the preceding year was, in oil 4800 tons in place of 2205, and of bone 230 tons in place of 119. But in 1829 there had been obtained 10,672 tons of oil, and 607 tons of bone; and in 1828, of oil 13,966 tons, and of bone 802 tons. The value of the whole produce of the fishery of 1831, when oil had

fallen from £50 to £30, and whalebone from £380 to £200, was estimated only at £190,000. The season of 1832 was considered prosperous.

It would be unfair, however, to judge of the value of the trade entirely from these two years. "The British fishery," it is remarked by the writer in the Edinburgh Cabinet Library, "has lately yielded a produce and value much exceeding that of the Dutch, even during the period of its greatest prosperity. In the five years ending with 1818, there were imported into England and Scotland 68,940 tons of oil, and 3,420 tons of whalebone; which, valuing the oil at £36 10*s.* and the bone at £90, with £10,000 in skins, raised the entire product to £2,834,110 sterling, or £566,822 per annum. The fishery of 1814, a year peculiarly fortunate, produced 1437 whales from Greenland, yielding 12,132 tons of oil, which, even at the lower rate of £32, including the whalebone and bounty, and added to the produce from Davis' Straits, formed altogether a value of above £700,000."

These, however, it is to be remembered, were the days of the bounty, which it is calculated cost the nation, from 1750 to 1824, upwards of two millions and a half. When we strike the account of national profits, therefore, resulting from this source, a deduction must be made from the apparent returns to the amount of that large outlay. But there are various considerations besides those already noticed, which seem to forbid us to indulge any expectation that the whale fishery can be long maintained as a great branch of national industry. Nearly every other people which has engaged in it has, in course of time, been withdrawn from it by circumstances, or abandoned it as a losing pursuit. The different seas in which it has been formerly carried on have all been successively exhausted of their stores; and that which is now principally resorted to is no doubt destined, ere long, to the same fate. Science and art, on the other hand, threaten to destroy the importance of the trade by the discovery of substitutes for its different products. The invention of illumination by gas has already rendered us independent of oil in regard to what was formerly its chief use. The pursuit is, after all, to be considered rather as a species of gambling adventure than as partaking of the nature of a regular branch of commercial enterprise. As in many other games, skill has, indeed, a certain part to play; but still the issue depends mainly upon chance. The same captain, in the same vessel, and exerting himself with the same ability and energy, may bring home a valuable cargo one year, and a clean ship the next. It is what has repeatedly happened.



[Dangers of the Whale Fishery.]

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THE DODO.



[The Dodo. From a Painting in the British Museum.]

THE above wood-cut, which has been carefully copied from a painting in the British Museum, represents a bird, of the existence of whose species a little more than two centuries ago there appears to be no doubt, but which is now supposed to be entirely extinct. It must be obvious that such a fact offers some of the most interesting and important considerations; and the subject, therefore, has claimed the particular attention of several distinguished naturalists. The most complete view of the evidence as to the recent existence of the Dodo is given in a paper, by Mr. Duncan, of New College, Oxford, which is printed in the twelfth number of the Zoological Journal. To this valuable article we are indebted for much of the following account.

The painting in the British Museum was presented to that institution by the late Mr. George Edwards; and the history of it is thus given in his work on birds:—

"The original picture from which this print of the dodo is engraved, was drawn in Holland, *from the living bird*, brought from St. Maurice's Island, in the East Indies, in the early times of the discovery of the Indies, by the way of the Cape of Good Hope. It (the picture) was the property of the late Sir Hans Sloane, to the time of his death; and afterwards becoming my property, I deposited it in the British Museum as a great curiosity. The above history of the picture I had from Sir Hans Sloane, and the late Dr. Mortimer, Secretary of the Royal Society."

The evidence of the former existence of this bird does not, however, entirely rest upon this picture and its traditionary history; for if it were so, it would be easier to imagine that the artist had invented the representation of some unknown creature, than that the species should have so utterly become lost within so comparatively short a time. There are three other representations of the dodo which may be called original; for they are given in very early printed books, and are evidently not copied one from the other, although they each agree in representing the sort of hood on the head, the eye placed in a bare skin extending to the beak, the curved and swelling neck, the short heavy body, the small wings, the stumpy legs and diverted claws, and the tuft of rump feathers.

The first of these pictures is given in a Latin work by Clusius, entitled 'Caroli Clusii Exoticorum,' lib. v. printed in 1605. He says that his figure is taken from a rough sketch in a journal of a Dutch voyager, who had seen the bird in a voyage to the Moluccas, in 1598; and that he himself had seen, at Leyden, a leg of the dodo, brought from the Mauritius.

The second representation is in Herbert's Travels, published in 1634. We subjoin his description of the bird, which is very quaint and curious;—

"The dodo comes first to our description, here, and in Dygarrois; (and no where else, that ever I could see or heare of, is generated the dodo.) (A Portuguize name it is, and has reference to her simplenes,) a bird which for shape and rareness might be called a Phænix (wer't in Arabia;) her body is round and extreame fat, her slow pace begets that corpulencie; few of them weigh lesse than fifty pound: better to the eye than the stomack: greasie appetites might perhaps commend them, but to the indifferently curious nourishment, but prove offensive. Let's take her picture: her visage darts forth melancholy, as sensible of nature's injurie in framing so great and massie a body to be directed by such small and complementall wings, as are unable to hoise her from the ground, serving only to prove her a bird; which otherwise might be doubted of: her head is variously drest, the one halfe hooded with downy blackish feathers; the other, perfectly naked; of a whitish hue, as if a transparent lawne had covered it: her bill is very howked and bends downwards, the thrill or breathing place is in the midst of it; from which part to the end, the colour is a light greene mixt with a pale yellow; her eyes be round and small, and bright as diamonds; her cloathing is of finest downe, such as you see in goslins: her trayne is (like a China beard) of three or four short feathers; her legs thick, and black, and strong; her tallons or pounces sharp, her stomack fiery hot, so as stones and iron are easily digested in it; in that and shape, not a little resembling the Africk Oestriches: but so much, as for their more certain difference I dare to give thee (with two others) her representation."

In this description there are several details that are no doubt inaccurate; such as the iron-digesting stomach; but the more important particulars agree with other evidence.

The third representation of the dodo is in Willughby's Ornithology, published about the end of the seventeenth century; and this figure is taken from one given in a Latin work on the natural and medical history of the East Indies, published by Jacob Bontius, in 1658. This figure exactly agrees with that of the picture in the British Museum. Our great naturalist Ray, who published, in 1676 and 1688, editions of Willughby's work, says, "We have seen this bird dried, or its skin stuffed, in Tradescant's cabinet." Tradescant was a person who had a very curious museum at Lambeth, and in his printed catalogue we find the following item: "Sect. 5, *Whole Birds*. Dodar, from the island Mauritius; it is not able to fly, being so big." Tradescant's specimen afterwards passed into the Ashmolean Museum at Oxford, where it is described as existing in 1700; but having become decayed, was destroyed by an order of the visitors in 1755. There is a beak, however, and a leg still preserved in the Ashmolean Museum; and there is a foot also in the British Museum, which was formerly in the Museum of the Royal Society. We are informed, by an eminent naturalist, that the foot at Oxford is much shorter, and otherwise much smaller, than the one in the British Museum, which shows that there must have been two specimens in this country.

Of the former existence, therefore, of the dodo, there appears to be no reasonable doubt; although the representations and descriptions of the bird may, in many respects, be inaccurate. Mr. Duncan, in answer to an application upon the subject made to a gentleman at Port Louis, in the Mauritius, learnt that there is a very general impression among the inhabitants that the dodo did exist at Rodriguez, as well as in the Mauritius itself; but that the oldest inhabitants have never seen it, nor has any specimen, or part of a specimen, been procured in those islands. Mr. Lyell states, in the second volume of his Principles of Geology, that M. Cuvier had showed him, in Paris, a collection of fossil bones discovered under a bed of lava in the Isle of France, amongst which were some remains of the dodo, which left no doubt in the mind of this great naturalist that this bird was of the gallinaceous tribe; that is, of the same tribe as the common domestic fowl, the turkey and the peacock.

In a paper "on the natural affinities that connect the orders and families of birds," published in the Transactions of the Linnean Society, the following observations occur on the dodo:—

"Considerable doubts have arisen as to the present existence of the Linnean *Didus* (dodo); and they have been increased by the consideration of the numberless opportunities that have latterly occurred of ascertaining the existence of these birds in those situations, the Isles of Mauritius and Bourbon, where they were originally alleged to have been found. That they once existed I believe cannot be questioned. Besides the descriptions given by voyagers of undoubted authority, the relics of a specimen preserved in the public repository of this country bear decisive record of the fact. The most probable supposition that we can form on this subject is, that the race has become extinct in the before-mentioned islands, in consequence of the value of the bird as an article of food to the earlier settlers, and its incapability of escaping from pursuit. This conjecture is strengthened by the consideration of the gradual decrease of a nearly conterminous group, the *Otis tarda* (bustard), of our British ornithology, which, from similar causes, we have every reason to suspect will shortly be lost to this country. We may, however, still entertain some hopes that the *Didus* may be recovered in the south-eastern part of that vast continent, hitherto so little explored, which adjoins those islands, and whence, indeed, it seems to have been originally imported into them."

The agency of man, in limiting the increase of the inferior animals, and in extirpating certain races, was perhaps never more strikingly exemplified than in the case of the dodo. That a species so remarkable in its character should become extinct, within little more than two centuries, so that the fact of its existence at all has been doubted, is a circumstance which may well excite our surprise, and lead us to a consideration of similar changes which are still going on from the same cause. These changes in our own country, where the rapid progress of civilization has compelled man to make incessant war upon many species that gave him offence, or that afforded him food or clothing, are sufficiently remarkable. The beaver was a native of our rivers in the time of the Anglo-Saxons; but, being eagerly pursued for its fur, had become scarce at the end of the ninth century, just in the same way as the species is now becoming scarce in North America. In the twelfth century its destruction was nearly complete. The wolf is extirpated, although it existed in Scotland at the end of the seventeenth century. The last bear perished in Scotland in 1057. In Isaac Walton's Angler, published soon after the time of Charles I., we have a dialogue between the angler and a hunter of otters,—a citizen who walked into the neighbourhood of Tottenham, to chase the animal in the small rivers of Middlesex. How rarely is an otter now found! The wild cat and the badger are seldom discovered, although they were formerly common;—the wild boar is never heard of. The eagle is now scarcely to be seen, except in the wildest fastnesses of the Highlands;—and the crane, the egret, and the stork, who were once the undisturbed tenants of the marshes with which the country was covered, are fled before the progress of cultivation. A single bustard (already mentioned) is now rarely found: they were formerly common in our downs and heaths, in flocks of forty or fifty. The wood grouse, which about fifty years ago were the tenants of the pine-forests of

Scotland and Ireland, are utterly destroyed. Facts such as these may show us that the recent existence, and the supposed extirpation of the dodo, may be supported by well-known examples in our own country. The general subject is full of interest;—and those who wish to pursue it may refer to the ninth chapter of Mr. Lyell's second volume; and to a valuable memoir by Dr. Fleming, in the Edinburgh Philosophical Journal, for October 1824.

The Toad.—The progress of natural philosophy has destroyed half the beauty of the celebrated simile of Shakspeare:—

"Sweet are the uses of adversity;
Which, like the toad, ugly and venomous,
Wears yet a precious jewel in his head."

Though the toad is still reputed venomous, yet no one imagines it to have a jewel in its head. This was however believed in Shakspeare's days. Mr. Steevens the commentator tells us, that it was the current opinion, that in the head of an old toad was to be found a stone or pearl, to which great virtues were ascribed. Thomas Lupton, in his 'First Booke of Notable Things,' 4to. bl. l., bears repeated testimony to the virtues of the "tode-stone, called Crapaudina." In his 'Seventh Booke' he instructs how to procure it; and afterwards tells us, "You shall knowe whether the tode-stone be the ryght and perfect stone or not. Holde the stone before a tode, so that he may see it; and if it be a ryght and true stone, the tode will leape towarde it; and make as though he would snatch it. He envieth so much that man should have that stone." It is hardly necessary to say any thing more about this jewel, which is of course a mere fantastic invention.

Modern writers express themselves with some doubt when speaking of the supposed venomous nature of the toad. Beck says, in his Medical Jurisprudence, "It is doubted at the present day, though formerly it was believed. King John of England is supposed to have been poisoned by a drink in which matter from a living toad had been infused. Pelletier has analyzed the venom of the common toad, and states it to consist of an acid, a very bitter and even caustic fat matter, and an animal matter having some analogy to gelatine. No experiments, however, appear to have been made with it." No scepticism on this point however appears to have disturbed that eminent novelist Boccaccio, who has a tale of which the tragic interest depends on the mortal venom of a toad. Two young lovers, Pasquino and Simona, are wandering in a garden, and happen to find a large cluster of sage plants; Pasquino plucks a leaf, and begins to rub his teeth and gums with it, observing that it is very good to do this after eating. He continues his conversation, but in a few minutes a sudden change comes over his countenance, and he expires. Simona is immediately accused by a friend of the deceased of having poisoned him, and taken before a magistrate. This respectable functionary, desirous of investigating the matter thoroughly, proceeds with the parties to the spot where the fatal accident took place, and where the body of Pasquino is lying, swelled up like a toad. Simona, in order to show the exact manner of her lover's death, plucks another sage leaf and uses it in the same manner, and dies suddenly on the spot. The magistrate, astonished at the catastrophe, observes that this sage is poisonous, which is not usual in the sage. Accordingly, he orders the plant to be rooted up, which is immediately done, when the cause of the death of these unfortunate lovers becomes manifest. Under this plant, says the Italian novelist, there was a wonderfully large toad, by whose venomous breath they perceived that the sage had itself become poisonous.

Natural and artificial Mineral Waters.—Artificial Seltzer water is certainly a highly valuable carbonated water, but yet it is not Seltzer water. So also the Carlsbad water, made according to chemical analysis, is a very useful alkaline water, but not Carlsbad water. Let the artificial one be drunk for some weeks, and debility of the digestive and general system will certainly follow. On the contrary, Carlsbad water can be taken for months without these consequences, nay, with increasing appetite and strength; a sufficient proof that something is present in the latter which is wanting in the former, and which counteracts the injurious effect of the alkaline salt.—*Hufeland, Praktische Uebersicht der vorzüglichsten Heilquellen Teutschlands.*

The complaisant Physician.—During his latter years, when he had retired from all but consultation practice, and had ample time to attend to each individual case, he was very deliberate, tolerant, and willing to listen to whatever was said to him by the patient; but at an earlier period, in the hurry of great business, when his day's work, as he was used to say, amounted to sixteen hours, he was sometimes rather irritable, and betrayed a want of temper in hearing the tiresome details of an unimportant story. After listening, with torture, to a prosing account from a lady, who ailed so little that she was going to the opera that evening, he had happily escaped from the room when he was urgently requested to step up stairs again;—it was to ask him whether, on her return from the opera, she might eat some oysters. "Yes, Ma'am," said Baillie, "shells and all."—*Lives of the British Physicians—Baillie.*

Poisonous Beads.—Those beautiful red seeds with a black spot brought from India, which are sometimes worn as ornaments of dress, are said by the natives to be so dangerous, that the half of one of them is sufficiently poisonous to destroy a man: this account, however, seems to exceed probability; but that they have a very prejudicial quality, I have no doubt, for within my own knowledge I have seen an extraordinary effect of the poison of one of these peas. A poor woman who had some of them given to her, and who did not choose to be at the expense of having them drilled to make a necklace, put the seeds into hot water till they were sufficiently soft to be perforated with a large needle; in performing this operation she accidentally wounded her finger, which soon swelled and became very painful, the swelling extending to the whole hand; and it was a considerable time before she recovered the use of it. The botanical name of the plant that produces this pea is *Abrus precatorius.*—*Elements of Science of Botany as established by Linnæus.*

BATTLE ABBEY.

This famous and once splendid ecclesiastical foundation owes its origin to the great battle between King Harold and William of Normandy, which deprived the former of his crown, and decided, at one of the most critical stages of her history, the fate of England. It has been repeatedly stated from Camden, in modern publications, that the village of Battle was known before this event by the name of Epiton. But this, as Mr. Gough many years ago remarked, is a mistake of the venerable antiquary, founded on an expression of the old chronicler Ordericus Vitalis, who uses the term Epiton, or rather Epitumium, merely for any field of battle. Ducange had long before explained the word in his Glossary. As to the village, it is expressly stated in old documents to have gradually sprung up around the abbey, and there is no reason to suppose that it existed at all before that building was erected. There seems, however, to have been a church on or near the spot in more ancient times, which was known by the name of the Church of St. Mary in the Wood. The neighbouring country remained covered with trees down at least to the Conquest; and this church was doubtless intended for the use of the peasants who were scattered up and down over the forest.

The town of Battle, which, with the parish, contains about three thousand inhabitants, stands on rising ground about eight miles north-west from Hastings. It commands a rich and extensive prospect, comprehending the expanse of the ocean to the south, and a sweep of highly cultivated country in all other directions. The village itself consists principally of a single street, which runs up the declivity, and at a little distance from the termination of which, on the top, stands the abbey.

It was on the 28th of September, 1066, that William of Normandy landed at Pevensey, or Pemsey, as it is commonly called, on the Sussex coast, about nine miles to the west of Hastings, at the head of the powerful armament with which he intended to win a kingdom. Harold was at the time in the north, where he had just achieved a great victory over another band of foreign invaders, the Norwegians, headed by their king, who fell



[Battle Abbey, Sussex.]

in the fight. Owing probably to this circumstance no attempt was made to oppose the landing of William. That leader, as soon as he had got his troops on shore, commenced the erection of a fort on the spot, and sunk, or as some authorities assert, burnt his ships, which are said to have been above nine hundred in number, without reckoning small craft. They must have been vessels of such size as to carry fifty or sixty men each. It was some time before Harold made his appearance to repel this aggression upon his dominions. But the two armies met at last on the 14th of October, the birth-day of the English king. Harold on that morning was posted on the eminence now occupied by the village of Battle, and his adversary on another rising ground a short distance to the south. A very full and animated account of the fight which ensued (commonly called the Battle of Hastings), has lately been given in an able publication, of which only the first volume has yet appeared, 'The Biographical History of England, edited by George Godfrey Cunningham;' the writer of which has evidently made himself very completely master of the details given by the various old French and Latin chroniclers, and has caught also not a little of their graphic spirit. The narrative is a great deal too long to be given entire, but we shall select a few passages sufficient to present at least an outline of the course of the battle.

"About nine in the morning, the Norman army began to move, crossed the interval between the two hills, and slowly ascended the eminence on which the English were posted. The banner of St. Peter, as a presage of victory, was borne in the van by Tonstain the Fair,—a dangerous honour, which two of the barons had successively declined. Harold beheld them gradually advance, and as the third division appeared, he broke out into violent exclamations of anger and dismay. He had the advantage of the ground, and having secured his flank by trenches, he resolved to stand upon the defensive, and to avoid all action with the cavalry, in which he was inferior. The men of Kent were placed in front, a privilege which they always claimed as their due. The Londoners had the honour of being the royal body guard, and were posted around the standard. The King himself, on foot, took his station at the head of the infantry, determined to conquer or perish in the action. The Normans rushed to the onset, shouting their national tocsin, 'God is our help!' which was loudly answered by the adverse cry of 'Christ's cross! The Holy cross!' . . . The battle soon became general, and raged with great fury. The Norman archers advancing, discharged their weapons with effect; but they were received with equal valour by the English, who firmly kept their ground. After the first shower of arrows, they returned to the attack with spears and lances; and again they were obliged to retire, unable to make any impression on their opponents. . . . The battle had continued with desperate obstinacy; and from nine till three in the afternoon, the success on either side was nearly balanced. . . . Disappointed and perplexed at seeing his troops every where repulsed by an unbroken wall of courageous soldiers, the Norman general had recourse to a stratagem. He resolved to hazard a feigned retreat; and a body of a thousand horse were ordered to take flight. The artifice was successful. The credulous English, in the heat of action, followed; but their temerity was speedily punished with terrible slaughter. . . Still the great body of the army maintained its position; for so long as Harold lived and fought, they seemed to be invincible. . . A little before sunset, an arrow, shot at random, pierced his eye: he dropped from his steed in agony; and the knowledge of his fall relaxed the efforts of his followers. . . A furious charge of the Norman horse increased the confusion which the King's wound must have occasioned. . . For a time, the Kentish men and East Saxons seemed to retrieve the fortune of the day. . . At length, the English banner was cut down, and the papal colours, erected in its place, announced that William of Normandy was the conqueror.

It was now late in the evening, but such was the obstinacy of the vanquished, that they continued the struggle in many parts of the bloody field long after dark. . . . The carnage was great. On the part of the conquerors, nearly sixty thousand men had been engaged, and of these more than one-fourth were left dead on the field. The number of the English and the amount of their loss are unknown. The vanity of the Normans has exaggerated the army of the enemy beyond the bounds of credibility; but the native writers reduce it to a handful of resolute warriors. The historians of both countries agree, that with Harold and his brothers perished all the nobility of the south of England."

The erection of Battle Abbey (the Abbatia de Bello, as it was called in Latin) was commenced by the Conqueror in the course of the following year, in conformity, it is said, with a vow which he had made before the fight, but was not completed till 1094, in the reign of Rufus. The high altar is asserted to have been placed on the spot where the dead body of Harold was found. It is more probable, however, as other authorities record, that the spot was that on which the royal standard was raised at the commencement of the battle. The house was originally intended to contain one hundred and forty monks, but only sixty were placed in it, who were brought from the monastery of Marmoustier in Normandy. Many manors, chiefly in the counties of Kent, Surrey, Sussex, Oxford, and Berks, were bestowed upon it, along with the most ample privileges,—exemption from all taxation, the rights of free warren, treasure trove, and sanctuary; independence of episcopal jurisdiction; and, to the abbot, the singular prerogative of pardoning any condemned thief or robber whom he should meet on his way to execution. Numerous charters, granted by the Conqueror, by William Rufus, by Henry I., and by other kings, down to Henry IV., in favour of this establishment, are still preserved, copies of several of which may be seen in Dugdale's Monasticon. Its possessions, in course of time, were greatly extended, through the liberality of its regal patrons. The abbot enjoyed the dignity of wearing the mitre, and was always summoned to parliament so long as the ancient religion lasted. The last individual who held the office was named John Hamond. He was elected in 1529, and in 1538 he surrendered the monastery to the King. According to the valuation which had been taken a few years before, its revenues amounted to £880, according to Dugdale, but Speed says to £987. Hamond retired on a pension of £66. 13*s.* 4*d.*

After the dissolution the property was granted to a person named Gilmer, who, after pulling down a great part of the buildings and disposing of the materials, sold the place to Sir Anthony Browne. The latter soon after commenced the erection of a dwelling-house on the site of part of the old monastery, which was finished by his son, the first Lord Montague. This building, however, fell afterwards into ruins; but the estate having been purchased by Sir Thomas Webster, the ancestor of the present Sir Godfrey Webster, a new house was erected, which still exists. It forms one of the sides of what appears to have been originally a complete quadrangle, of great spaciousness. The entire circuit of the ruins of the abbey, indeed, is not much short of a mile. Only a fragment of the church now remains, from which it is impossible to trace either its form or extent; but there are still to be seen some arches of the cloisters, a hall called the refectory, about 150 feet in length, and another building detached from the rest, exhibiting the remains of an immense room, 166 feet in length by 35 in breadth, the walls of which are still adorned by twelve windows on one side and six on the other. This is supposed to have been the great hall, in which the abbot and his monks gave their more solemn entertainments. Good living seems to have been cultivated in the establishment. The ample kitchen still exhibits the remains of no fewer than five fire-places.



[The Gateway at Battle Abbey, Sussex.]

One of the most striking parts of the ruin is the great gate at the entrance of the quadrangle, of which the wood-cut above is a representation. It is supposed to be of the reign of Henry VI., and, with its battlemented towers, is a very imposing structure. Until about forty years ago, the apartment over the gateway was used as a town-house; but on the 18th of September, 1794, the roof was driven in by a violent storm of wind and rain, and it has not since been repaired.

OLD TRAVELLERS.—No. 3.

ROBERT KNOX—*concluded.*

For eight or nine successive years did these courageous men make this dangerous journey, or, as Knox calls it, "this northern discovery." In one year they got as far as Hourly, at the very extremity of the King of Kandy's dominions, but they could not proceed on account of the drought. Another year they met the black servant-boy whom Knox had dismissed long before, and who was now settled in the low country, married, and the father of a family, but miserably poor. This fellow, on promise of a bountiful reward, undertook to guide them the next year to the Dutch settlements on the coast. Unfortunately at the time appointed Knox was detained by a violent attack of pleurisy, so that they missed the Indian, and they did not yet think themselves sufficiently acquainted with the route he had proposed, to attempt it without him.

At length, when they thought their frequent going and coming had lulled all suspicion as to their escaping, and that they were masters of all the information about the country they were likely ever to obtain, Robert and his companion left their pleasant house at Elledat for the last time. This was on the 22d of September, 1679, after more than nineteen years of captivity.

Furnished with such arms as they could secrete, as knives and small axes, and with wares to sell as formerly, they struck boldly through a country swarming with wild elephants, tigers, and bears. When they came to a more peopled district they were alarmed and brought to a dead stand, by intelligence that a number of officers from court were there collecting the king's duties and revenue. On this they edged away to a secluded village, where they "sate to knitting" until they heard the officers were gone. They then went onwards, having purchased a quantity of cotton-yarn, and kept most of their wares, to serve as a pretext for their going farther to sell them. At Colliwilla their only road lay directly through the grounds of a governor, who was there on purpose to see and examine all who passed. With great presence of mind, instead of showing timidity, which would have ruined them, they went boldly up to this grandee's house, and told him they were going forward to purchase dried flesh*, a commodity much in request in the upland country. The governor seeing their trading habits, and the property they had with them, never suspected their intention; his favour, moreover, was conciliated by a present of "knives, with fine carved handles, and a red Tunis cap." Not to show any hurry or anxiety, one of them then went round the neighbourhood, pretending to be bargaining for dried meats, whilst the other remained at the governor's house knitting.

They had acquired all the confidence they stood in need of, and thought they might go on, without danger of being followed, until they should be out of the reach of pursuit, when some soldiers arrived at Colliwilla from the court, with orders to the governor to increase the vigilance of his watch, lest any suspicious persons should escape from the Kandyar dominions. This intelligence was as a death-blow to Knox and his companion, who expected every minute to be arrested, and carried back by these soldiers from the capital. Their admirable self-possession, however, again saved them, and they saw the soldiers return towards the interior without troubling or suspecting them.

The next morning, after securing about their persons such things as were most necessary for their journey, they went to the governor. "I carried him," says Knox, "four or five charges of gunpowder, a thing somewhat scarce among them, entreating him, rather than we should be disappointed of flesh, to make use of that and shoot some deer; while I told him we would make a step to Anarodgburro, to see what flesh we could procure there. In the mean time, according as we had before laid the business, came Stephen, with the bundle of all our goods, desiring to leave them in the governor's house till we came back, which he was very ready to grant us leave to do; and seeing us leave such a parcel of goods, though, God knows, of little account in themselves, yet of considerable value in that land, he could not suppose otherwise but that we were intended to return. Thus we took our leaves, and immediately departed, not giving him time to consider with himself, or consult with others about us."

They now forced their way through a desolate wood to Anarodgburro, which was not inhabited by Cingalese, but by a tribe from the coast of Malabar, who had never seen a white man. Here they were carried before the governor, whom they duped with their usual skill and success, still pretending they were only come to buy dried flesh for the interior of the country. At this place they were a hundred miles advanced on their journey. Stephen Rutland staid quietly in the town, while Knox, saying he was in search of dried deer's flesh, which, fortunately for them, happened to be very scarce that season, went from place to place, and furnished himself with some rice, a brass pot to boil it in, a little meat, and some deer-skin to make shoes for themselves. After three days most patiently spent in this manner, they set off unobserved and unsuspected. They had found out the direct road to Jafnapatan, and another Dutch settlement, but this was vigilantly guarded by the Cingalese. They thought it would be safer for them to go right through the forest, shaping their course by the sun and moon; but the ground was burnt up, and they feared they should perish that way for want of water. At last they decided that their safest way would be to follow the course of a river they had seen between Colliwilla and Anarodgburro, and which they had reasonably concluded must flow into the sea. Accordingly they turned back some miles on the road by which they had come, delaying their departure until night, when they knew, from their fear of wild beasts, they should meet none of the natives abroad. This was on the 12th of October, and on a Sunday night, the moon being eighteen days old. They calculated that the provisions Knox had procured for the journey would last them ten days. "Our weapons," says Robert, "were, each man a small axe fastened to a long staff in our hands, and a good knife by our sides, which were sufficient, with God's help, to defend us from the assaults of either tiger or bear; and as for elephants there is no standing against them, but the best defence is to flee from them." For tents they carried two great talipat leaves, which are generally used by the natives of Ceylon for that purpose, as well as for umbrellas*.

On reaching the river, which was the Malwat Oyah, they left the road and struck into the wild forests by the river's side. They avoided treading on the sand or soft ground, and when they were obliged to do so they walked backwards, so that the print of their feet would have indicated they had gone in an opposite direction. They pursued their journey till nightfall, when, contrary to their expectations, it came on to rain. To shelter themselves they set up their two talipat leaves, and lit

* This dried flesh is chiefly that of the deer killed in the low countries by the Vaddas, or Veddahs, who dry it in the sun, or preserve it by putting it into the hollow of a tree, which hollow they previously coat with honey, and then close up the aperture with clay. The Veddahs, or wild men, never cook this dried meat but cover it with honey and eat it raw.

* The talipat, or tallipot, is a species of palm tree, which is straight and grows to a prodigious height. Its broad leaves, when dried, are strong and exceedingly elastic. They can be expanded or shut up like a lady's fan. When open, they are large enough to cover from the sun or rain, ten or fifteen men, and when closed they are not thicker than a man's arm. They are very light.

a fire, by which they rested themselves until the moon rose. Hitherto they had always travelled barefoot, but having now to prosecute their journey by night, and through rough woods, they bound up their feet in pieces of the deer-hides Knox had bought for the purpose at Anarodgburro.

Though the moon gave little light through the thick trees, Robert and his comrade walked on for some three or four hours, when they were brought to a stand by a single wild elephant that they could not scare away. This obliged them again to light a fire. When day broke the elephant was gone, and the wilderness around them seemed never to have been trodden by the foot of man. Soon after, however, they came unexpectedly on an inhabited district called Tissea Wava, and to escape being seen by the natives were obliged to hide themselves all day in a hollow tree. As soon as it was dark they went forward, and presently ran as fast as their legs could carry them, for they heard the hallooing of men's voices behind them, and thought they were pursued; "but at length," says Robert, "we heard elephants behind us, between us and the voices, which we knew by the noise of cracking the boughs and small trees, which they break down and eat. These elephants were a very good guard behind us, and were, methought, like the darkness that came between Israel and the Egyptians. For the people, we knew, would not dare to go forwards, hearing elephants before them."

They pitched their talipat leaves that night by the side of the river, boiled rice and roasted some of their flesh, and after supper slept tranquilly for some hours.

When the moon shone out brightly they again renewed their difficult walk. They had nothing more to fear from the Cingalese having passed their country, but they had reached the range of the Vaddas, a race of wild men who lived by hunting, and who were very likely to shoot them with arrows, if they met them there. One day at noon they were very near being discovered by a number of wild women and children, who came to wash themselves in the river, close to a rock where the fugitives were reposing.

They travelled from Sunday to Thursday "still along by the river side," says Robert, "which turned and winded very crooked. In some places it would be pretty good travelling, and but few bushes and thorns, and in others a great many, so that our shoulders and arms were all of a gore, being grievously torn and scratched. For we had nothing on us but a clout about our middles, and our victuals on our shoulders, and in our hands a talipat and an axe."

They were frequently puzzled at the confluence of other rivers to know which stream to follow. On Thursday afternoon they crossed a river called Coronda Oyah, on which they came again on the territory of the Malabar colony. From this point the forests were perfectly impenetrable, so that they were obliged to crawl along the rocky bed of the river, in which there was little water but a terrific quantity of alligators, and of bears, wild buffaloes, and elephants, that were constantly coming there to drink or cool themselves.

Though the people of the country on which they had now entered paid tribute to the Dutch, Knox knew they were better affected towards the King of Kandy, and feared, every moment, that some of them would meet him and Stephen, and send them back, after all they had done and suffered.

It was not, however, until Friday afternoon that they saw any human beings. They then came up unexpectedly with two Bramins, or priests, sitting under a tree boiling rice, who did not molest them, but accepted all the money the fugitives had (about five shillings), a red Tunis cap, and a knife, to show them their way to the nearest Dutch settlement,—a service they soon discovered they were unable or unwilling to perform.

When the Bramins left them, they continued their way down the rugged bed of the river as before; but they were this night in great danger from elephants, which were so numerous and fearless that the fire they lit did not deter their approach. They were obliged constantly to throw fire-brands at the intruders in every direction.

But this was the last of the perils these firm-hearted men had to encounter in this wonderful flight. The next morning they came to land as smooth as a bowling green, and soon after met a native who was in the service of the Dutch, and who told them that all the country thereabouts was subject to the Europeans, that they were only six miles from the Dutch fort of Arrepa, and out of all danger.

They then went confidently up to some native villages, and were conducted from one to the other, on their way, until they reached the fort, "it being," says Knox, "about four of the clock on Saturday afternoon, October the 18th, 1679; which day God grant us grace that we may never forget, when he was pleased to give us so great a deliverance from such a long captivity, of nineteen years and six months and odd days, being taken prisoner when I was nineteen years old, and continued upon the mountains among the heathen till I attained to eight and thirty."

At fort Arrepa they were received with astonishment and great kindness by the Dutch, who sent them forward the next day to their other settlement at Manaar. Among the first to welcome them at Manaar were a Scotch and an Irish soldier in the service of Holland, who carried them to their lodgings and treated them most hospitably. All the people of the place flocked to see them as men that had performed a miracle.

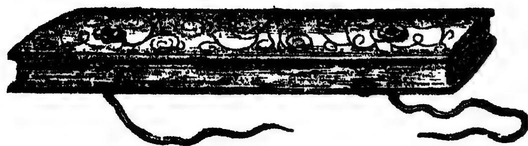
Their health had been excellent during their arduous journey; but three days after their arrival at Manaar, Stephen Rutland fell so sick that Knox thought he should have lost him. Stephen, however, rallied, and the two friends were carried together in a Dutch ship to Colombo and thence to Batavia. At Batavia they were taken up by an English merchant vessel and conveyed to Bantam, where "they found the good ship Cæsar bound for England, the land of *their* nativity and long wished for port."

The year after his arrival in England, Robert Knox published his account of Ceylon and his adventures. His old quarto volume enjoyed great and well merited popularity at the time; it was immediately translated into French and Dutch, and it still remains as the most perfect and spirited description of Ceylon that any literature can boast of. It has been reprinted of late years. It is truly an astonishing book, considering the poor captive's education and circumstances. The natural history of the country, its government, laws, manners and customs, its agriculture and every other matter, on which rational curiosity can be indulged, are all fully and *accurately* detailed. We use the term "accurately" on good grounds, for gentlemen who have resided many years in Ceylon, and who were with the first English expedition to the interior of that island, have assured us that they found every thing precisely as Knox had described it, and that after considerable research and long acquaintance with the country, they were convinced that nothing could be corrected in, and very little added to, the sailor's account of it.

In the year 1819, when we were undisputed masters of Kandy, Mr. Henry Marshall, surgeon to the forces, and two other British officers, made a little expedition to Elledat, the place where Knox so long resided, and whence he set out on his escape. The place—"the point of land," as he describes it, "standing into a corn-field, so that corn-fields were on three sides of it," was easily discovered; but the houses of Ceylon are built chiefly of mud and rushes, and when abandoned, soon

obliterated by the winds and rains. Not a trace remained of his residence, but the memory of Knox was preserved in tradition by the poor Cingalese in the neighbourhood, who told Mr. Marshall that a white and *a very good man*, a long time ago, lived at Elledat for many years.

A CINGALESE BOOK.



The inside is made of strips of the leaves of the Talipot-tree, which we shall describe in an early number; the outside, or the boards which keep the leaves together, are of hard wood (generally the Jack-tree), and are often beautifully ornamented and painted. The leaves are laid one over the other. They are not sewed, but kept together by two strings, which pass through two holes made in each of them, and are fastened to the upper covering of the book by two knobs, which are sometimes made of crystal.

A Village of Chess-players.—During an excursion into Germany in the summer of 1831, I stayed for a few days at Halberstadt. In the neighbourhood of this town is a small village called Stroebeck, which has been celebrated for some centuries on account of its inhabitants being very good chess-players. Some have stated that this village holds its lands upon the tenure of forfeiture if any one of their community lose a game at chess, and that therefore they decline finishing a game with a stranger; this is, however, erroneous. The following is the account given by the inhabitants of the origin of the game of chess in the village:—A dignitary of the cathedral at Halberstadt was exiled to Stroebeck, and being consequently deserted by his former friends, he became the more attached to the inhabitants of the village, and determined on teaching them the game of chess. He found to his delight that they became partial to it, and made great progress in it; he soon felt himself doubly recompensed for the trouble he had taken, for not only did they become proficients in the game, but it afforded him many opportunities of improving their morals and behaviour, which became visible in their intercourse with their neighbours; after a time he was recalled, and became Bishop of Halberstadt. He, however, did not forget *his* Stroebeck, as he used to call it; but, on the contrary, often went there, and conferred many benefits on the community; amongst others, he instituted a free-school there.—Such is the account given by the inhabitants of the village, which contains about one hundred and twenty houses.—*Lewis's Chess Lessons*, vol. ii.

Natural Wonder.—On the south side of the island (Mauritius) is a point called "the Souffleur" (the Blower), from the following circumstance. A large mass of rock runs out into the sea from the main land, to which it is joined by a neck of rock not two feet broad. The constant beating of the tremendous swell which rolls in has undermined it in every direction, till it has exactly the appearance of a Gothic building with a number of arches in the centre of the rock, which is about thirty-five or forty feet above the sea; the water has forced two passages vertically upwards, which are worn as smooth and cylindrical as if cut by a chisel. When a heavy sea rolls in, it of course fills in an instant the hollow caverns underneath, and finding no other egress, and being borne in with tremendous violence, it rushes up these chimneys, and flies roaring furiously to a height of full sixty feet. The moment the wave recedes the vacuum beneath causes the wind to rush into the two apertures with a loud humming noise, which is heard at a considerable distance. My companion and I arrived there before high water, and having climbed across the neck of rock, we seated ourselves close to the chimneys, where I proposed making a sketch, and had just begun, when in came a thundering sea, which broke right over the rock itself, and drove us back much alarmed. Our negro guide now informed us, that we must make haste to recross our narrow bridge, as the sea would get up as the tide rose. We lost no time, and got back dry enough; and I was obliged to make my sketches from the main land. In about three-quarters of an hour the sight was truly magnificent. I do not exaggerate in the least when I say that the waves rolled in long and unbroken full twenty-five feet high, till, meeting the headland, they broke clear over it, sending the spray flying over to the main land; while from the centre of this mass of foam, the Souffleur shot up with a noise which we afterwards heard distinctly between two and three miles. Standing on the main cliff, more than a hundred feet above the sea, we were quite wet. All we wanted to complete the picture was a large ship going ashore.—*Journal of the Royal Geographical Society*, vol. iii. part 1.

Habits of Birds.—The continuance of a nest in the same spot for several years is more remarkable in the case of migratory birds than in that of magpies, which do not migrate, and seldom go to any considerable distance from their breeding trees. There has been in a garden adjacent to ours, the nest of a black-cap for a succession of years, and broods have been successively reared there, without any observable increase in the population of the species. Yet this bird, which is little bigger than a wren, weighing only half an ounce, has to traverse annually the whole of the south of Europe, and probably a great proportion of the north of Africa, exposed of course to numerous accidents, as well as to occasional scarcity of its appropriate food. From the regular annual restoration, however, of this nest at the same spot, it is obvious that one, if not both of the black-caps, must have been wont to perform this extensive migration to and from Africa as safely as the more hardy cuckoo or the more swift-winged swallow. During the spring of 1831, the black-caps, which we suppose to be the same birds, from their keeping to the same place of nestling, were more than usually late in arriving; for in another garden about a mile off, there were young in the hereditary nest of black-caps before our little neighbours made their appearance from the south. When they did arrive, their attention was immediately attracted by the unusual circumstance of hearing the loud song of a rival in the vicinity of their premises. This was a cock black-cap, which we had purchased the preceding autumn in the bird-market at Paris, and which was daily hung out in his cage to enjoy the fresh air and the sunshine, within a gun-shot of their usual place of nestling. The wild birds did not appear to like the little stranger at all; and the cock kept flying around the cage, alternately exhibiting curiosity, fear, anger, defiance, and triumphant exultation. Sometimes he would flit from branch to branch of the nearest tree, silently peeping into the cage with the utmost eagerness; all at once, he would dart off to a great distance as if afraid that he was about to be similarly imprisoned; or getting the better of his fears, he would perch on a conspicuous bough and snap his bill, calling *check, check*, seemingly in a great passion; again he would sing his loudest notes by way of challenge, or perhaps meaning to express his independence and superiority. Our cage-bird, meanwhile, was by no means a passive spectator of all this; and never failed, on the appearance of the other, to give voice to his best song and to endeavour to outsing him, since he could not get at him to engage in personal conflict.

This sort of altercation continued for more than a week, but the wild bird became gradually less eager to pry into the cage or to take any other notice of the cage-bird; and at length ceased altogether to approach it, his attention being now wholly occupied in attending to his mate and aiding her in building their nest. It is worthy of remark, that though on their first appearance they resorted to the garden where the nest had hitherto been built, they finally fixed their residence in another garden, at some distance, induced no doubt by the vicinity of our cage-bird to their former haunts. The distance of the place to which they removed is such, that we can readily hear the song of the cock, and our bird is no less eager to answer and to endeavour to outsing him than at first; while, it is worthy of remark, that the wild bird seems no longer interested in such rivalry, and sings as if his only concern was to please himself and his mate.—*From the 'Habits of Birds,' just published in the series of Entertaining Knowledge.*

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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ADAM'S PEAK, IN THE ISLAND OF CEYLON.



[Distant View of Adam's Peak from Fort Colombo Roads.]

A VERY amusing collection might be made of the wonderful and fabulous accounts of this mountain, given at different ages of the world, by Pagan, Christian, Musselman, and Hindoo travellers; but it will be more instructive to our readers to give them an accurate description of the spot, abridged from a tour in Ceylon by Mr. Marshall, who is one of the very few Europeans that have ascended Adam's Peak *.

This gentleman performed the fatiguing journey in 1819, accompanied by S. Sawers, Esq., Commissioner of Revenue in the Kandyan provinces. Starting from the city of Kandy, and proceeding in a south-westerly direction towards the mountain, the travellers were three days in performing thirty-nine miles, so rugged in parts, and in others covered with forest-trees and low jungle, was the country which they had to traverse. On the third day they saw the few huts of the natives, built on the extreme jagged points of the loftiest mountains, to escape the ravages of elephants. At the end of this day's journey they were only eighteen miles from the foot of the peak, or the upper cone, yet it took them two days to perform that distance.

On the fourth day there was a considerable degree of ascent in their road, and they found the trees covered with moss or lichen. For some distance their pathway lay along the ridge of a narrow hill, on each side of which flowed a river. "The rivers," says Mr. Marshall, "at some places fell over stupendous precipices, forming cascades of great magnitude. From the height of one of these cascades the whole mass of water which passed over the rock seemed to rise again in white vapour." Above and beyond these impetuous rivers rose lofty ranges of peaked mountains, the whole presenting one of those magnificent pictures which have made men of good taste, who have travelled in Ceylon, declare that it is one of the most picturesque countries in the world.

The peak has always been considered as a holy mount, a pilgrimage to which was highly meritorious and beneficial. The returning pilgrims, as an act of charity, always disposed of their walking-staves on the face of the hill, so as to assist future travellers in their ascent. When Mr. Marshall and his friend came to a very steep part of the road, they found a succession of these walking-sticks stuck firmly in the earth, and bundles of rods laid horizontally behind them, by which means tolerable steps were formed. As, however, pilgrimages by the road by which they came had almost

* This tour was published some years since in the 'Transactions of the Wernerian Medical History Society of Edinburgh;' and, though so curious, has hitherto been little known except to gentlemen of the medical profession.

ceased since the dominion of the English, all these conveniences were rapidly going to decay.

On the sixth day of their journey, when they were four hours going about six miles (all the distance they performed), their guides were frequently at a loss to distinguish the path they ought to follow, from the tracks of wild elephants through the jungle. On reaching the top of a very high hill they had a near view of the peak, which rose before them like an immense acuminated, or sharp-pointed dome. Whenever the natives, in the course of the journey, caught a glimpse of the holy mount (the *Mallua Sri Pade*, or "the hill of the sacred foot" in their language), they raised their clasped hands over their heads, and devoutly exclaimed "*Sāā! Sāā!*" Their zeal had increased the nearer they approached, but at this point their holy fervour was extreme.

The next morning, before they began the fatiguing ascent of the peak, they came to a small river, where the natives performed the ceremony of ablution, preparatory to the delivery of their offerings at the shrine of the holy foot. Their offerings chiefly consisted of a few small copper coins, which the devotees wrapped in a piece of cloth; the cloth was then wrapped in a handkerchief that encircled their head, it being indispensable that the offering should be carried on the head, the noblest portion of the human frame.

From the river the pathway went up a narrow, rugged ravine,—in the wet season the bed of a torrent, and impassable. Thick jungle and lofty trees threw a wild gloom over this hollow, and intercepted the view. When they had made about two-thirds of the ascent they were informed that they were at the place where those who professed the religion of Buddhoo offered *needles and thread* to their divinity. The Buddhists in their train had thought little of this singular religious duty, for there was only one needle, with a little thread, found among the whole party. This, however, they made do duty for the whole, one succeeding another in taking up the needle and thread, and then replacing it on a small rock to the right of the road.

Their way was now more difficult than ever, as the superior portion of the peak consists of an immense cone of granitic rock, bearing no trees, and but very partially covered with vegetation. "The track," says Mr. Marshall, "over several places of this cone is quite abrupt; and where the pathway leads over a bare declivious rock (tending to some fearful precipice) there are steps cut in the stone, and iron chains so fixed as to lie along the steps, for the purpose of assisting passengers in ascending and descending."

Sir William Ouseley found these chains mentioned in an old Persian manuscript, but as far as we know no other reference was ever made to them. Robert Knox, who had not the advantage of seeing the place, has no mention of these chains. He merely says, "On the south side of Conde Uda is a hill, supposed to be the highest on this island, called in the Chingalay language, *Hamalell*; but by the Portuguese and other European nations, *Adam's Peak*. It is sharp like a sugar-loaf, and on the top a flat stone with the print of a foot like a man's on it, but far bigger, being about two feet long. The people of this land count it meritorious to go and worship this impression; and generally about their new year, which is in March, they, men, women, and children, go up this vast and high mountain to worship."

Mr. Marshall and his companion reached the top of the cone about two hours after they had begun to ascend at its base. They found that its narrow apex, which was only twenty-three paces long by eighteen broad, was surrounded by a wall, in which there were two distinct openings to admit pilgrims, corresponding to the two tracks by which alone the mountain can be ascended. The elevation of this apex is 6800 feet above the level of the sea; the granitic peak or cone resting upon a very high mountain belonging to the chain which forms the rampart of the upper country. Nearly in the centre of the enclosed area they saw a large rock, one side of which is shelving, and can be easily ascended. On the top of this mass, which is of granite, there stands a small square wooden shed, fastened to the rock, as also to the outer walls, by means of heavy chains. This security is necessary to prevent the edifice being hurled from its narrow base by the violence of the winds. The roof and posts of this little building, which is used to cover the *Sri Pade*, or holy foot-mark, was adorned with flowers and artificial figures made of party-coloured cloth. The impression in the rock they found to have been formed in part by the chisel, and in part by elevating its outer border with hard mortar: all the elevations which mark the spaces between the toes of the foot have been made of lime and sand. The impression, which is five feet and a half long, two feet and a half broad, and from one and a half to two inches deep, is encircled by a border of gilded copper in which are set a few valueless gems. To use Mr. Marshall's words, "According to the books respecting Buddhoo, it appears that he stepped from the top of the peak to the kingdom of Siam. The Buddhists profess to believe that the impression is a mark made by the last foot of Buddhoo which left Ceylon." We believe it was the Arabs*, who traded here in very early ages, that first changed the hero of the tale, and gave the foot-mark to Adam, our first father.

On Mr. Marshall's arrival he found between forty and fifty pilgrims, who had ascended in an opposite direction, already there. They performed their devotions without heeding the strangers, and then suddenly departed, and descended the mountain, without seeming to look to the right or to the left.

During the day small parties of pilgrims continued to arrive from time to time. They were of all ages—some mere children, and others decrepit from old age. As they entered the area they immediately approached the rock in the centre, and gradually ascended to the holy foot-mark. They did not go under the shed, but stood facing the end of the impression which is intended to mark the toes. Here they made a number of most profound reverences, by putting the palms of the hands together, and holding them before the face, or raising them above the head. While thus employed they appeared to be muttering some words. They then presented their offerings which were all deposited in the sacred impression for a time, and consisted of copper money, rice, cocoa-nuts, cotton cloth, handkerchiefs, betel leaves, flowers, onions, ornaments for the shed that covers the impression, a lock of the hair of the head, or a portion of the beard. They remained on the rock a few minutes, making profound reverence to the holy foot-mark, and then descended and formed a line in the area, with their faces still towards the impression. Then one of the group opened a small book, formed of palm leaves, and chaunted some passages from it. At the termination of each passage, men, women, and children joined in a loud chorus of responses. These passages consisted of their five commandments, which are all prohibitory and forbid,—

1st. Killing any living creature.
2d. Stealing.
3d. Committing adultery.
4th. Uttering a falsehood.
5th. Drinking intoxicating liquors.

When this was over the pilgrims went to two bells hung on frames near the central rock, and individually rang one of them, by pulling a string attached to the clapper. They then took some strips of cloth which had

* "The Mussulmans of Hindostan," says Mr. Marshall, "make pilgrimages to the peak; and, according to report, the reason they assign for visiting this mountain is, that they believe the impression to be that of Adam, our first parent."

been previously dipped in oil or *ghee* (liquid butter), lit them at one end, and placed them upon an iron stand, erected for the purpose, or upon the edge of a large stone.

On a shelf of the same rock on which the foot is traced, there is also a small temple dedicated to Vishnu, whom the pilgrims conciliate with offerings of small sums of money. All the ceremonies were finished in less than a quarter of an hour, when the party instantly proceeded to the opening in the wall, and left the area free to those whose next turn it was.

Two Buddhist priests were on duty to take charge of the offerings of the devout *, which are forwarded at the end of the season to the chief priest at Kandy. The average annual amount is about £250 sterling, an important sum for that people. These priests only reside in this lofty solitude during the period when pilgrims visit it, or from January to April inclusive, being the dry season on the west side of the island. During the wet months the peak is commonly enveloped in clouds, and the ascent to it impracticable. They were attended by a boy, and occupied a little hut immediately without the encircling walls. They strenuously objected (as did also the natives who had accompanied Mr. Marshall and his friend) to the English travellers remaining there all night, saying that disease and other calamities would be the inevitable consequence of their so doing. Their motive for this objection arose out of their belief, that such a long stay of white men at the sacred spot would be displeasing to their divinities.

Seeing however that the travellers, who had determined to stay, would not be moved from their purpose, the senior priest gave them a number of plants, solemnly assuring them, that by wearing a part of one of them as an amulet, they would be protected from the attack of bears. In like manner parts of other plants were calculated to defend them from wild elephants; and others from devils, sickness, &c. &c. One herb that he offered, he said was a sure preservative against misfortunes, sickness. and every kind of evil.

Mr. Marshall and Mr. Sawers took up their quarters in a low hut about six feet square, which stood close to the rock of the holy mark. They amused themselves in watching the singular atmospheric effects, and the grandeur, and at times the eccentric motions of the clouds, as they were observable from that height at different times of the day, and by moonlight, and at the rising of the sun the next morning.

We give Mr. Marshall's description of moonlight and sun-rise :—

"By midnight the clouds had subsided to the lower strata of the atmosphere, and appeared to be all lying on the surface of the earth. The moon shone bright, by which means we had a magnificent view of the upper surface of a dense stratum of white fleecy cloud. It is impossible to convey in words the grandeur of this scene. The surface of the earth was overspread with a covering resembling the finest white down, through which many dark-coloured mountains and cliffs projected. Could we conceive a white sea studded over with islands extremely various in size and figure, a faint idea might be entertained of the prospect from the peak during the night.

"The clouds continued to rest undisturbed on the bosom of the earth until a little after six o'clock. For some time before sun-rise the sky towards the east had a bright flame colour, indicative of the approach of day. The sun burst forth suddenly in all his glory: not a cloud intervened to dim his splendour. Immediately after the rising of the sun, the shadow of the peak appeared like an immense cone or triangle stretching to the edge of the western horizon. In a few minutes the base of the shadow approached the foot of the mountain. Soon after the appearance of the sun, light floating vapours began to rise from the upper surface of the clouds, which were quickly dissolved in the superincumbent stratum of transparent air."

Immediately without the wall that encircles the area, and for a few yards down the declivity of the rock, there grows a species of rhododendron, with large crimson-coloured flowers, and very thick leaves.

The travellers descended the cone by the opposite route leading to Saffragam, which they found to be still more abrupt than that by which they had ascended coming from Kandy. In several places it led them across bare, slippery, precipitous rocks. There were no steps cut, as on the other side of the cone, but in the more difficult and dangerous places there were strong iron chains fastened to the rock, to assist ascent and descent. At two or three turns the view downward was grand and awful in the extreme, the cone at these points seeming to overhang the lower mountain, by which means the eye plunged perpendicularly almost to the base of the peak. Meanwhile the sun shining brightly upon the space where the view terminated at the bottom of the mountain, increased thereby the sublimity of the prospect. "It is impossible," says Mr. Marshall, in concluding his interesting sketch of this remarkable place, "to describe the terrific grandeur of the scene; but indeed the prospect is so frightful, that I believe it is rarely contemplated with due composure."

* The only services they have to perform besides this seems to be, to go to the impression of the foot before the sun sets, to ring a bell over it, to fan it with a small fan, and to cover it with flowers, making between whiles a vast number of profound reverences.

THE CARTOONS OF RAFFAELLE.—No. 6.

THE MIRACULOUS DRAUGHT OF FISHES.

However slender the materials, or few the incidents supplied by his subject, the compositions of Raffaelle are never meagre or common-place. The cartoon of Christ calling Peter and Andrew, or, as it is more frequently named, the Miraculous Draught of Fishes, has fewer figures and a less complicated arrangement than any other of the series. Nevertheless, it has all Raffaelle's characteristics;—simplicity, perspicuity, emphatic expression, and clear development of the story. Christ having entered the boat for the purpose of addressing the people who had collected on the shore of the lake of Gennesaret, and having finished his discourse, desired the fishermen to "launch out into the deep, and let down the nets for a draught. Simon Peter answering, said unto him, Master, we have toiled all night and have taken nothing; nevertheless, at thy word, I will let down the net." Christ's discourse, to which Peter had been previously listening, and the miraculous draught of fishes which ensued, convinced Peter that he was in the presence of a being of superior nature; and his exclamation, "Depart from me, for I am a sinful man, O Lord!" expresses the fear and reverence consequent on that impression.—This is the point of the narrative which Raffaelle has chosen: Peter has fallen on his knees before Christ, who re-assures him with an expression of gentle benignity, announcing at the same time the high vocation to which he had appointed him,—"Fear not, from henceforth thou shalt be a fisher of men." Andrew, the brother of Peter, who likewise became a disciple, stands behind, and is also about to prostrate himself before the Saviour. In a series of designs comprehending the acts of the Apostles, the propriety of choice in this subject is obvious: one of the most extraordinary circumstances in the history of Christianity is the astonishing results produced by agents of such humble origin, and apparently so inadequate to so mighty a task. Here we see them engaged in their original avocation; but notwithstanding the homely garb of the fishermen, we perceive in the grand character of their heads, and in the solemn sentiment which seems to inspire them, indications of power which show them to be

fit instruments for the great undertaking which they were called on to accomplish. The figure of Christ, who sits apart in the stern of the boat, is simple and majestic. The second boat is occupied by Zebedee and his two sons, James and John, who also "forsook all, and followed Christ." In the cartoon, however, they are merely seen at the moment, when, having been called by Peter and Andrew to their assistance, they are strenuously endeavouring to draw up the overladen net. The action of these two figures, besides giving a picturesque variety to the effect, adds force to the mental expression of Peter and Andrew.



[THE MIRACULOUS DRAUGHT OF FISHES.]

The aquatic character of this cartoon, so dissimilar from the rest, gives it, especially in the original pictures and in the tapestries copied from them, a peculiar look of novelty and freshness. Raffaelle, who is in all things characteristic, has not indicated a shallow stream merely, but a broad lake which occupies the whole expanse of the picture. All is in unison. The water-fowl are not only proper to the scene, but assist the perspective by the interposition of their large dark forms; they serve also to break the uniformity which would otherwise have resulted from the extended lines of the two boats.

Much criticism has been expended on the smallness of those boats. In what relates to the scriptural text, their small dimensions are fully justified, as they are described to have been in danger of sinking from the weight of the fish thrown into them. But setting aside that consideration, Raffaelle, in making them entirely subordinate, acted only on an acknowledged rule in art, which demands that inferior objects are always to be sacrificed when they are likely to come in competition with the principal.

MINERAL KINGDOM.—Section 9.

ORGANIC REMAINS.

We find in the lowest beds of the series of the secondary strata that the organic remains consist chiefly of corals and shells; that is, of animals having a comparatively simple anatomical structure, and that as we ascend in the series, the proportion of animals of more complicated forms increases, the bones of land quadrupeds being almost entirely confined to the more recent members of the tertiary strata. From these circumstances, it is a received opinion among certain geologists, that the first animals which were created were of an exceedingly simple structure, that they gradually became more complex in their frame, and that at last the highly complicated mechanism of the human body was the completion of those repeated efforts of nature towards perfection. It has been further maintained that there has been an uninterrupted succession in the animal kingdom effected by means of generation, from the earliest ages of the world to the present day; that new species and transformations have been gradually produced by the growth of new parts, originating from certain efforts of the animal to fulfil particular instincts, such as the foot of a bird becoming webbed, from repeated efforts to swim; and that the ancient animals which we find in a fossil state, however different in structure they may be, were in fact the ancestors of those now living. Those who are desirous of seeing a clear statement of this doctrine of the gradual development of animal life, and at the same time an equally clear exposition of its unsoundness, will find both in the first and second chapters of the second volume of Lyell's Principles of Geology.

Although it be true, that in the lower strata there is a large proportion of the remains of animals which possess an apparently simple structure, nothing can be more unsound than to found upon such observations a doctrine such as we have above stated. What we have at one time called simple has again and again been afterwards found to be exceedingly the reverse, so that the term is really nothing more than an expression of our ignorance, a statement of the limit beyond which we have not yet been able to advance. The animalcules called *Infusoria*, are living creatures found in stagnant waters, so wonderfully minute that they are invisible to the naked eye, (a collection of many thousand individuals occupying no greater space than the tenth part of an inch.) For a long time after they were discovered by means of the microscope, they were thought to be little more than specks of animal matter endowed with locomotive powers, but the ingenious researches of Ehrenberg, a philosopher of Berlin, who employed a very powerful instrument, laid open to our wondering sight a new creation. That distinguished naturalist has shown that these animalcules are provided with limbs and organs, and with a system of vessels and nerves; and even figures of their teeth accompany his curious memoir. Thus, the lowest member in the supposed graduated scale of animal structure, in place of being a simple body, is probably a very complicated piece of mechanism. Besides, corals and shells, though of most frequent occurrence, are not the only animal remains found in the lower strata, for recent observations have discovered in these rocks the vertebræ or joints of the backbone of fishes, as well as other parts belonging to them, and even impressions of entire fish have been met with. Now one single undoubted specimen of an animal of that description, found in such a situation, is as conclusive as ten thousand would be in overthrowing the whole doctrine, that there has been a gradual development of structure in animal life as we ascend from the lowest to the uppermost strata.

A most curious circumstance connected with fossils is the unequivocal evidence they afford of there having been formerly a completely different state of our planet with regard to climates, from that which now exists. Throughout all the strata, from the lowest member of the secondary series up to the last layer lying immediately beneath that which, in geological language, is termed a formation of the recent period, we find in our northern latitudes numerous remains of animals and plants belonging to genera which are now only known to exist in tropical climates. In the most northern part of Asiatic Siberia, at the mouth of the River Lena, which flows into the Arctic Ocean, in the 70th degree of latitude, there are vast accumulations of the bones of an extinct species of elephant, and in such a state of preservation that a great part of the ivory used in St. Petersburg is brought from thence. Indeed the quantity is so great that a Russian naturalist has stated it as his belief that the number of elephants now living on the globe must be greatly inferior to those which occur in a fossil state in those parts of Siberia. The entire carcass of one of those animals was found enclosed in a mass of ice, where it must have remained incased for thousands of years; and yet, from the preservative quality of the ice, the flesh was in such a state that when it was disentombed by the accidental breaking up of the mass, it was devoured by the wolves and other wild animals. Then as to plants, specimens of rocks have been brought from Melville Island, the remote northern land discovered in our late polar expeditions, some of which contain, imbedded in the stone, portions of plants belonging to an order now known only to exist in the warmest parts of the equatorial regions. The greatest degree of heat seems to have existed during the deposition of the inferior beds of the secondary strata; and it appears also, from the nature of the fossil plants found in these strata, that there must have existed, at the same time, a very considerable degree of moisture in the atmosphere. The heat seems to have gradually diminished, so that at last, during the deposition of the most recent of the tertiary strata, the climate of the northern hemisphere does not appear to have been very different from what it is now.

To endeavour to account for this wonderful change in the temperature of the northern latitudes, is one of the most difficult problems in the physical history of the globe, because it involves such a variety of considerations; and we know that the most important and extensive changes in the forms of organized bodies are brought about by very nice shades of difference in the circumstances of climate and soil under which they are placed. In the earlier states of geology many theories were started: the earth was said to have been originally in a highly heated state, to have gradually cooled, and it was maintained that during the progress of cooling the various changes in climate took place; according to another theory, the position of the axis of the earth was at one time different from what it is now; and was so directed that the polar regions were exposed to a much more direct action of the solar rays; but the inventors of these theories did not trouble themselves much with inquiring whether they were in harmony with the laws which regulate the motions of the heavenly bodies; and when they were subjected to the examination of the astronomer, they could not stand the test of his severe investigations. An ingenious theory has been lately proposed by Mr. Lyell, in the first volume of his 'Principles of Geology,' which calls in no extraordinary agency, and assumes no condition of the globe inconsistent with the established laws of nature of which we have had experience. His theory is, that all the indications of the former prevalence of warmer climates may be accounted for by a different distribution of land and water; and we know from geological appearances, that a very different proportion of superficial land and water must formerly have existed in the northern

hemisphere from that which we now find. It is not very easy to state the grounds of this theory in an abridged form; but the following explanation will perhaps convey an intelligible idea of it. Wherever there is a great expanse of water, like the sea, there is always a more uniform temperature in the adjoining countries throughout the year, less extremes of heat and cold. On the contrary, extensive tracts of land are liable to considerable vicissitudes; and hence the difference of an insular and continental climate in the same parallel of latitude. Moscow and Edinburgh are very nearly in the same latitude, but while at the latter place there is neither extreme cold nor excessive heat, at Moscow the cold in winter is sometimes so intense as to freeze quicksilver, and there are often days in summer as hot as at Naples. In like manner, the higher you ascend, the air becomes colder; and thus in lofty mountains, such as Ætna, the sugar-cane grows at the foot, and the lichen, or moss of Iceland, at the summit. In the lofty mountains of South America there are regions of eternal snow under an equatorial sun. If we suppose, therefore, extensive continents, lofty mountains, and numerous islands to have existed in southern latitudes where there is now a wide expanse of sea, and an ocean to have occupied the place of northern Europe and Asia, it will be readily conceived, from the principles above stated, that very different climates would exist in the northern hemisphere from what now prevail.

All the solid strata most abundant in *animal* remains are either limestones or contain a large proportion of lime in their composition. Many thick beds of clay also abound in them; but in that case limestone in some form or other is generally associated with the clay. From this it has been inferred, and not without a strong semblance of probability, that animals have mainly contributed to the formation of many limestone strata, in the same way as we see them now at work forming vast limestone rocks in the coral reefs of the Pacific Ocean. A reef of this sort extends for three hundred and fifty miles along the east coast of New Holland, and between that country and New Guinea the coral formations have been found to extend, with very short intervals, throughout a distance of seven hundred miles. Of all the forms of organized bodies which are found in a fossil state, from the lowest stratum in which they occur to those of most modern date, shells and corals constitute by far the greatest proportion. All the strata must have been deposited in seas or lakes, and it is therefore natural that animals living in water should be most abundant; besides, as shells and corals are not liable to decay, they remain, while the soft boneless animals which inhabit them perish entirely; and fish-bones, being more perishable than shells, are comparatively rare. Fossil shells and corals present, in general, no forms that would appear as any thing peculiar to an ordinary observer who had seen a collection of existing shells, and it would therefore convey no useful geological information were we to give representations of them. But there are a few of the extinct genera of marine animals that are different in form from any thing that now exists, and we propose to give in our next section some examples of these.

LONGEVITY.

AT page 26 of the first volume of the Penny Magazine there is a notice of some remarkable instances of exception to the ordinary duration of human life; such as Demetrius Grabowsky, who died lately in Poland, at the age of one hundred and sixty-nine years. It is added that Jenkins, the oldest man on record in England, lived exactly as long as the Polish shepherd. A correspondent (Dr. Edmund Fry) has favoured us with the following epitaph on Jenkins, from his monument in the church of Bolton-upon-Swale. The inscription was written by Dr. Thomas Chapman.

"Blush not marble!
To rescue from oblivion
The memory of
HENRY JENKINS,
A person obscure in birth,
But of a life truly memorable:
For
He was enriched
With the goods of nature,
If not of fortune;
And happy in the duration,
If not variety,
Of his enjoyments.
And though the partial world
Despised and disregarded
His low and humble state,
The equal eye of Providence
Beheld and blessed it
With a patriarch's health
And length of days;
To teach mistaken man
These blessings
Were entailed on temperance,
A life of labour, and a mind at ease;
He lived to the amazing age
Of 169 years!

He was interred here, the 6th December,
1670,
And had this justice done to his memory,
1743."

Our correspondent proceeds to give the two following instances of extraordinary longevity; the latter of which, although the most remarkable case on record, appears to have excited little attention.

On a long freestone slab in Caerey Church, near Cardiff, in the county of Glamorgan, is the following inscription, in capitals, round the ledge:—

"Here lyeth the Bo-
Dy of WILLIAM EDWDS of the
Cairey, who departed
This life the 24 of Feb-
Ruary Anno Domini 1668, Anno
Que ætatis suæ 168."

On the body of the stone:—

"O happy change!
And ever blest
When greefe and pain is
Changed to rest."

In the 'County Chronicle' of December 13, 1791, a paragraph was inserted, stating that Thomas Cam, according to the parish register of St. Leonard, Shoreditch, died the 28th January, 1588, aged 207 years! The correspondent of that paper adds, "This is an instance of longevity, so far exceeding any other on record, that one is disposed to suspect some mistake, either in the register or in the extract." Our correspondent, having lately met with this paragraph in his common-place book, determined, he says, to apply to the parish-clerk of St. Leonard's, from whom he, at length, obtained an extract from the register of burials, a literal copy of which is subjoined:—

1588.	BURIALLES	Fol: 35.
	THOMAS CAM was buriel* ye 22 inst of Januarye Aged 207 years	
		Holywell Street
		GEO. GARROW
Copy Augst 25, 1832		Parish Clerk

"It thus appears," adds our correspondent, "that Cam was born in the year 1381, in the fourth of Richard II., living through the reign of that monarch; and through those of the whole of the following sovereigns, viz. Henry IV., Henry V., Henry VI., Edward IV., Edward V., Richard III., Henry VII., Henry VIII., Edward VI., Mary, and to the thirtieth of Elizabeth."

* The word *buriel* is correctly copied from the original.

Such an extreme duration of life is, however, contrary to all recorded experience; and unless the fact can be supported by other evidence, it is reasonable to conclude that the entry in the register is inaccurate.

THE VOICE OF SPRING.

I come, I come! ye have call'd me long,
I come o'er the mountains with light and song!
Ye may trace my step o'er the wakening earth,
By the winds which tell of the violet's birth,
By the primrose-stars in the shadowy grass,
By the green leaves opening as I pass.

I have breathed on the South, and the chesnut-flowers,
By thousands, have burst from the forest-bowers,
And the ancient graves, and the fallen fanes,
Are veil'd with wreaths on Italian plains.
—But it is not for me, in my hour of bloom,
To speak of the ruin or the tomb!

I have pass'd o'er the hills of the stormy North,
And the larch has hung all his tassels forth,
The fisher is out on the sunny sea,
And the rein-deer bounds through the pasture free,
And the pine has a fringe of softer green,
And the moss looks bright where my step has been.

I have sent through the wood-paths a gentle sigh,
And call'd out each voice of the deep-blue sky,
From the night-bird's lay through the starry time,
In the groves of the soft Hesperian clime,
To the swan's wild note by the Iceland lakes,
When the dark fir-bough into verdure breaks.

From the streams and founts I have loosed the chain;
They are sweeping on to the silvery main,
They are flashing down from the mountain-brows,
They are flinging spray on the forest-boughs,
They are bursting fresh from their sparry caves,
And the earth resounds with the joy of waves.

Come forth, O ye children of gladness, come!
Where the violets lie may be now your home.
Ye of the rose-cheek and dew-bright eye,
And the bounding footstep to meet me fly,
With the lyre, and the wreath, and the joyous lay,
Come forth to the sunshine, I may not stay!

The summer is hastening, on soft winds borne,
Ye may press the grape, ye may bind the corn;
For me I depart to a brighter shore,—
Ye are marked by care, ye are mine no more.
I go where the loved who have left you dwell,
And the flowers are not Death's,—fare ye well, farewell!

Mrs. Hemans.

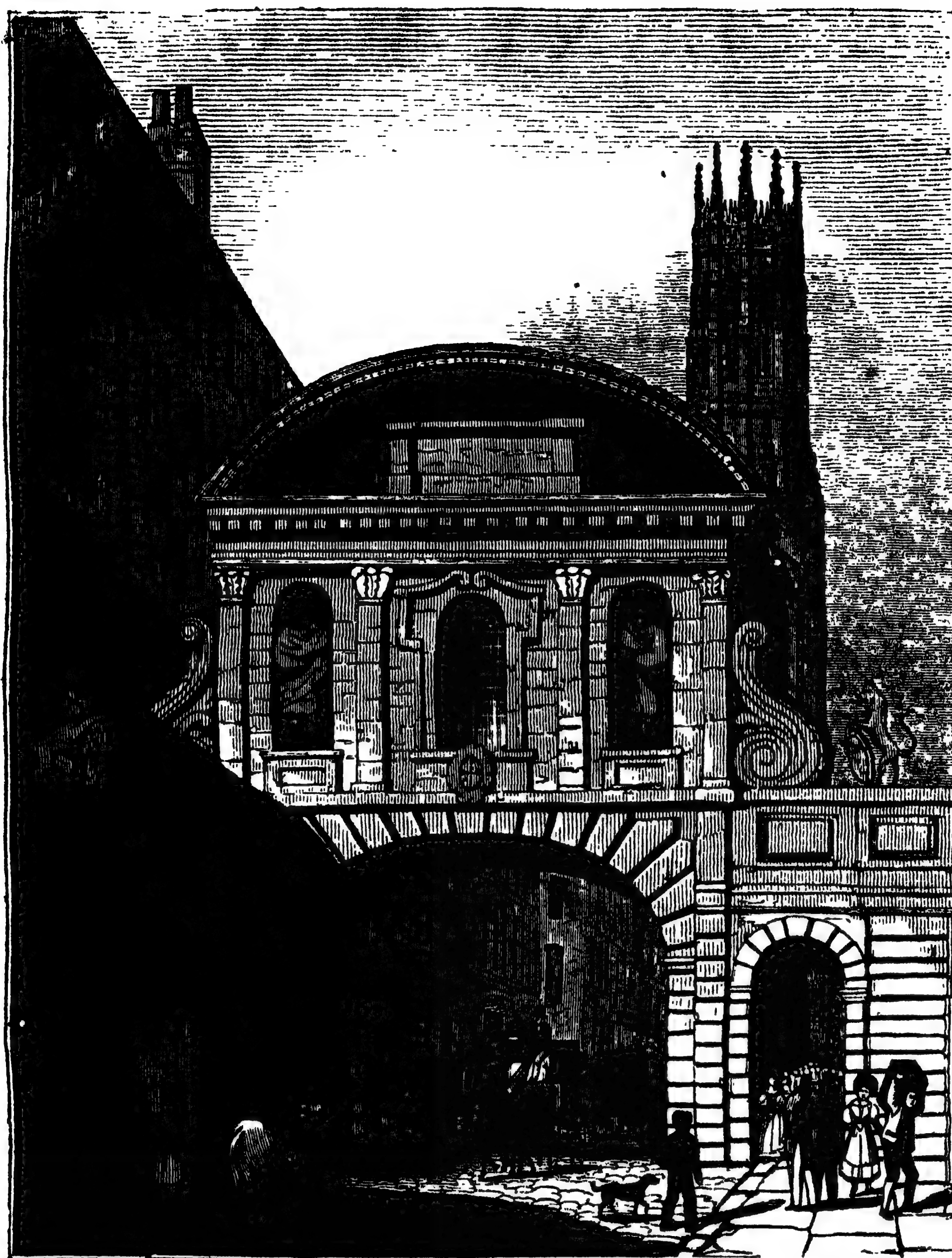
TEMPLE BAR.

London does not appear to have been surrounded with a wall, and fortified, till about the commencement, or, as others conjecture, towards the close of the fourth century. The enclosure which the Romans then threw around it is stated to have been twenty-two feet in height, strengthened at intervals with towers which were forty feet high. From the remains of it, which were examined about the beginning of the last century by Dr. Woodward, it was found to have been nine feet thick at the foundation, and to have been built of Roman tiles or bricks, cemented with a mortar which had become as hard as the stone. It seems to have commenced at the Tower; from which point it proceeded along the Minories and Houndsditch, crossed Bishopsgate, followed nearly the line of the present London-wall to Fore-street, turned thence across Aldersgate, then took a south-west direction upon Newgate-street, and following the same course across Ludgate-hill, terminated on the river at the end of the present New Bridge street, where Blackfriars Bridge is now built. The entire circuit was rather above two miles.

In the time of Fitzstephen, who wrote his curious description of London in the reign of Henry II., the gates of the city were seven in number, and are conjectured to have been the Postern-gate on Tower-hill, Ald-gate, Bishops-gate, Cripple-gate, Alders-gate, New-gate, and Lud-gate. Moor-gate, at the north end of Coleman-street, was afterwards added in the beginning of the fifteenth century. There were also leading to the river, along the northern bank of which there had at one time extended a wall between the Tower and Blackfriars Bridge, Bridge-gate on London Bridge, and others called by Stow, Dow-gate, Wolf-gate, Eb-gate, Puddle-dock-gate, Oyster-gate, Butolphs-gate, Billingsgate, and the Water-gates at the Tower and Custom House. But these seem to have been rather what we should now call wharves, being merely landing-places for merchandize.

From this sketch, it appears that Temple Bar, now the only remaining city-gate, is not on the line of the original city-wall at all. Here, "in ancient times," says Maitland, writing about the middle of the last century, "were only posts, rails, and a chain, such as now are at Holborn, Smithfield, and Whitechapel Bars. Afterwards there was a house of timber erected across the street, with a narrow gateway, and an entry on the south side of it, under the house. But since the great fire, there is erected a very stately gate, with two posterns, one on each side, for the convenience of foot-passengers, with strong gates to shut up in the nights, and always good store of watchmen, the better to prevent danger. This gate is built all of Portland stone, of rustic work below, and of the Corinthian order. Over the gateway, on the east side, fronting the city of London, in two niches, are the effigies in stone of Queen Elizabeth and King James I., very curiously carved, and the king's arms over the keystone of the gate, the supporters being at a distance over the rustic work. And on the west side, fronting the city of Westminster, in two niches, are the like figures of King Charles I. and King Charles II., in Roman habits. Through this gate are two passages for foot-passengers; one on the south, over which is engraven, 'Erected, Sir Samuel Starling, being Maior.' And another, on the north, over which is engraven, 'Continued, Sir Richard Ford, Maior; finished, Sir George Waterman, Maior.' The State, since the erection of this gate, has particularly distinguished it, by ordering the heads of such as are executed for rebellion or high treason to be fixed on the top thereof."

This particular description will save us the necessity of entering into any further architectural details. The gate was built by Sir Christopher Wren, but is certainly not one of his happiest works. The figures and other ornamental parts of the structure are now greatly obliterated; but the statues of Charles I. and II. were at one time regarded as having some merit. The shutting of the gate every night, which took place in Maitland's time, is now dispensed with; that ceremony being only performed on occasion of the King going to the city, when the royal procession is not admitted till a pursuivant has knocked, and permission has been granted by the Lord Mayor. The propriety of taking down Temple Bar altogether has been urged for at least the last fifty or sixty years; and it seems to have been at one time determined that it should be removed. The demolition, however, about the beginning of the present century, of the old pile of buildings called Butcher Row on the north side of the Strand, by widening the street immediately to the west, has been the means of preserving this last remaining land-mark of the peculiar jurisdiction of the city. Before this improvement the outlet here was narrow and inconvenient to the last degree. It was known by the name of the Pass, under which it is frequently mentioned in the 'Spectator.'—(See Nos. 498, 526, 534, &c.)



[West Front of Temple Bar.]

The distinction which Maitland speaks of, as having been conferred upon this gate by the State selecting it as a station for the exhibition of the heads of dead traitors, is now to be reckoned only among its remembered honours. The State has ceased to indulge in these barbarous exhibitions. The last heads that were thus exhibited, were those of some of the persons who suffered after the rebellion of 1745. The horrible show excited, as might be supposed, no little curiosity. Horace Walpole, in one of his letters, dated 16th August, 1746, says, "I have been this morning at the Tower, and passed under the new heads at Temple Bar, where people make a trade of letting spy-glasses at a halfpenny a look." It is hardly possible to conceive any thing more revoltingly unsuitable than such an exhibition in the heart of a crowded and busy city. Mr. Brayley, in his Londiniana, mentions that one of the iron poles or spikes above the gate on which the heads used to be placed, was only removed at the commencement of the present century. There is no room to apprehend, in the improved state of public feeling, that such an ensign of old barbarity will ever be replaced. Sometimes the heads thus exposed were allowed to bleach for years in the sun and rain, when at last the wind would blow them down into the street. This, Nichols, in his Literary Anecdotes, mentions, happened to the head of Counsellor Layer, as he was called, who was executed for high treason at Tyburn, on the 17th of May, 1723. It was picked up by Mr. John Pearce, an attorney, a gentleman who resided in the neighbourhood. How strangely it would sound in the present day to hear of the skull of some well-known character being thus kicked about one of our principal streets.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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ASCENT OF THE PETER BOTTE MOUNTAIN, IN THE MAURITIUS.



[View of the Peter Botte Mountain.]

ASCENT OF THE PETER BOTTE MOUNTAIN, MAURITIUS, ON THE 7th SEPTEMBER, 1832.

In the third volume (recently published) of the Journal of the Royal Geographical Society, there appears an account of a very extraordinary exploit which has been lately performed by a party of our countrymen—the ascent of the mountain known by the name of Peter Botte, in the Mauritius. The island called the Mauritius and the Isle of Bourbon lie near to each other, off the east coast of Africa, having however the great island of Madagascar between them and that continent. They were first discovered in the sixteenth century by Pedro Mascarenhas, a Portuguese, from whom the group to which they belong is sometimes called that of the Mascarenhas. Its discoverer himself gave to the Mauritius the name of Ilha do Cerno. The Portuguese, however, never formed a settlement here; and in 1598 the island was taken possession of by the Dutch admiral Van Nek, who called it by the name by which it is now commonly known, after Maurice, Prince of Orange. The Dutch finding it of little use, although they had begun to colonize it in 1640, abandoned it altogether in 1712; and in 1721 the French, who had been already for some time in possession of the neighbouring Isle of Bourbon, began to colonize it. From them it received the name of the Isle of France, and they retained it till December, 1810, when it was taken from them by the English. It still remains a British colony.

The Mauritius is extremely mountainous, and exhibits in every part of it the marks of volcanic action. Some of the mountains are between two and three thousand feet in height, and are covered with snow during a great part of the year. Among them are several that assume the most singular and fantastic shapes; but the most extraordinary in its appearance is that which bears the name of Peter Botte, from a person who is said by tradition to have climbed to its summit many years ago, and to have lost his life in coming down again. This, however, is a mere unauthenticated rumour; and even if the attempt was actually made by the person in question, it is evident that the fate which overtook him must have rendered it impossible to say whether he succeeded in his enterprise or not. In point of fact, the top of the mountain has been usually regarded as quite inaccessible, notwithstanding the boast of a Frenchman about forty years ago that he had succeeded in reaching it. The attempt has also been several times made by our own countrymen since the island became a British possession; but always till now in vain. The exploit, however, has been at length accomplished in the course of the last year. The account of its successful performance is given in a letter from one of the parties in the enterprise, which was communicated to the Geographical Society by Mr. Barrow. We have been permitted to copy from the journal the striking representation of the mountain which accompanied the original account. "From most points of view," says the writer, "it seems to rise out of the range which runs nearly parallel to that part of the sea-coast which forms the bay of Port Louis (the capital, situated on the west side of the island); but on arriving at its base, you find that it is actually separated from the rest of the range by a ravine or cleft of a tremendous depth." The mountain appears, from the account, to be about eighteen hundred feet high.

Captain Lloyd, chief civil engineer, accompanied by Mr. Dawkins, had made an attempt in 1831 to ascend the mountain, and had reached what is called the Neck, where they planted a ladder, which did not, however, reach half way up the perpendicular face of rock beyond. Still, Captain Lloyd was convinced, that with proper preparation the feat might be accomplished. Accordingly, on the morning of the 7th September last this gentleman, along with Lieutenant Phillpotts of the 29th Regiment, Lieutenant Keppel, R.N., and Lieutenant Taylor, the writer of the letter, set out on the bold and perilous adventure. "All our preparations being made," says the narrative, "we started, and a more picturesque line of march I have seldom seen. Our van was composed of about fifteen or twenty sepoys in every variety of costume, together with a few negroes carrying our food, dry clothes, &c. Our path lay up a very steep ravine, formed by the rains in the wet season, which, having loosened all the stones, made it any thing but pleasant; those below were obliged to keep a bright look-out for tumbling rocks, and one of these missed Keppel and myself by a miracle."

Along this path, which was not a foot broad, they picked their way for about four hundred yards, the negroes keeping their footing firm under their loads, by catching hold as they proceeded of the shrubs above them. We must allow Lieutenant Taylor to continue the story in his own words:—

"On rising to the shoulder, a view burst upon us which quite defies my descriptive powers. We stood on a little narrow ledge or neck of land, about twenty yards in length. On the side which we mounted, we looked back into the deep wooded gorge we had passed up; while on the opposite side of the neck, which was between six and seven feet broad, the precipice went sheer down fifteen hundred feet to the plain. One extremity of the neck was equally precipitous, and the other was bounded by what to me was the most magnificent sight I ever saw. A narrow, knife-like edge of rock, broken here and there by precipitous faces, ran up in a conical form to about three hundred or three hundred and fifty feet above us; and on the very pinnacle old 'Peter Botte' frowned in all his glory.

"After a short rest we proceeded to work. The ladder (see sketch) had been left by Lloyd and Dawkins last year. It was about twelve feet high, and reached, as you may perceive, about halfway up a face of perpendicular rock. The foot, which was spiked, rested on a ledge, not quite visible in the sketch, with barely three inches on each side. A grapnel-line had been also left last year, but was not used. A negro of Lloyd's clambered from the top of the ladder by the cleft in the face of the rock, not trusting his weight to the old and rotten line. He carried a small cord round his middle; and it was fearful to see the cool, steady way in which he climbed, where a single loose stone or false hold must have sent him down into the abyss; however, he fearlessly scrambled away till at length we heard him halloo from under the neck 'all right.' These negroes use their feet exactly like monkeys, grasping with them every projection almost as firmly as with their hands. The line carried up he made fast above, and up it we all four 'shinned' in succession. It was, joking apart, awful work. In several places the ridge ran to an edge not a foot broad; and I could, as I held on, half-sitting, half-kneeling across the ridge, have kicked my right shoe down to the plain on one side, and my left into the bottom of the ravine on the other. The only thing which surprised me was my own steadiness and freedom from all giddiness. I had been nervous in mounting the ravine in the morning; but gradually I got so excited and determined to succeed, that I could look down that dizzy height without the smallest sensation of swimming in the head; nevertheless, I held on *uncommonly hard*, and felt very well satisfied when I was safe under the neck. And a more extraordinary situation I never was in. The head, which is an enormous mass of rock, about thirty-five feet in height, overhangs its base many feet on every side. A ledge of tolerably level rock runs round three sides of the base, about six feet in width, bounded every where by the abrupt edge of the precipice, except in the spot where it is joined by the ridge up which we climbed. In one spot the head, though overhanging *its* base several feet,

reaches only perpendicularly over the edge of the precipice; and, most fortunately, it was at the very spot where we mounted. Here it was that we reckoned on getting up; a communication being established with the shoulder by a double line of ropes, we proceeded to get up the necessary *matériel*,—Lloyd's portable ladder, additional coils of rope, crowbars, &c. But now the question, and a puzzler too, was how to get the ladder up against the rock. Lloyd had prepared some iron arrows, with thongs, to fire over; and, having got up a gun, he made a line fast round his body, which we all held on, and going over the edge of the precipice on the opposite side, he leaned back against the line, and fired over the least projecting part: had the line broke he would have fallen eighteen hundred feet. Twice this failed, and then he had recourse to a large stone with a lead-line, which swung diagonally, and seemed to be a feasible plan: several times he made beautiful heaves, but the provoking line would not catch, and away went the stone far down below; till at length Æolus, pleased, I suppose, with his perseverance, gave us a shift of wind for about a minute, and over went the stone, and was eagerly seized on the opposite side.—Hurrah, my lads, 'steady's' the word! Three lengths of the ladder were put together on the ledge; a large line was attached to the one which was over the head, and carefully drawn up; and, finally, a two-inch rope, to the extremity of which we lashed the top of our ladder, then lowered it gently over the precipice till it hung perpendicularly, and was steadied by two negroes on the ridge below.—'All right, now hoist away!' and up went the ladder, till the foot came to the edge of our ledge, where it was lashed in firmly to the neck. We then hauled away on the guy to steady it, and made it fast; a line was passed over by the lead-line to hold on, and up went Lloyd, screeching and hallooing, and we all three scrambled after him. The union-jack and a boat-hook were passed up, and old England's flag waved freely and gallantly on the redoubted Peter Botte. No sooner was it seen flying, than the Undaunted frigate saluted in the harbour, and the guns of our saluting battery replied; for though our expedition had been kept secret till we started, it was made known the morning of our ascent, and all hands were on the look-out, as we afterwards learnt. We then got a bottle of wine to the top of the rock, christened it 'King William's Peak,' and drunk his Majesty's health hands round the Jack, and then 'Hip, hip, hip, hurrah!'

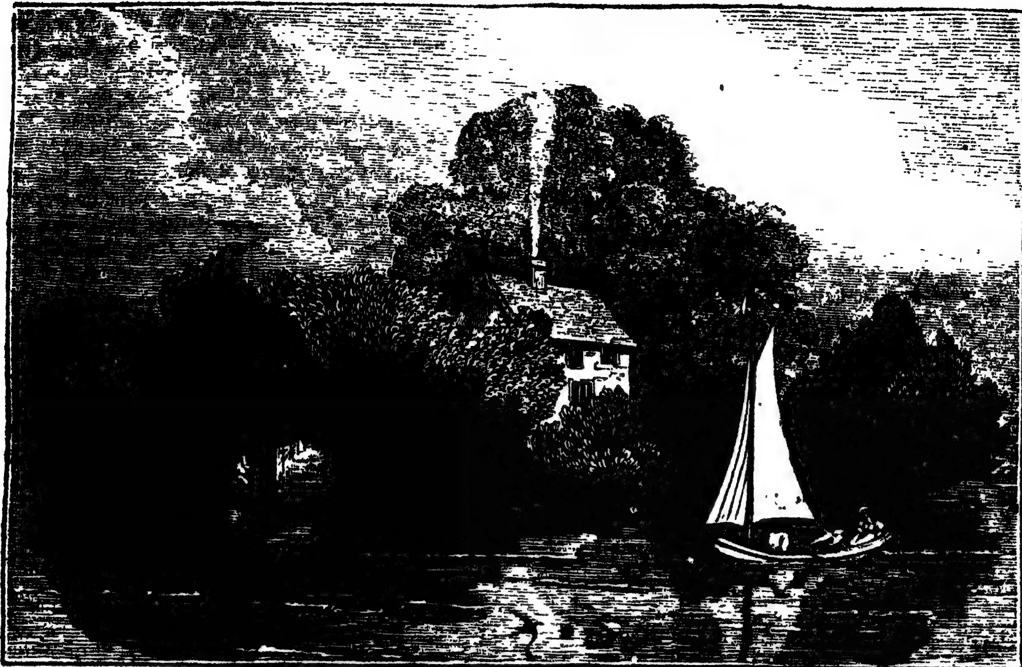
"I certainly never felt any thing like the excitement of that moment; even the negroes down on the shoulder took up our hurrahs, and we could hear far below the faint shouts of the astonished inhabitants of the plain. We were determined to do nothing by halves, and accordingly made preparations for sleeping under the neck, by hauling up blankets, pea-jackets, brandy, cigars, &c. Meanwhile, our dinner was preparing on the shoulder below; and about 4 P.M. we descended our ticklish path, to partake of the portable soup, preserved salmon, &c. Our party was now increased by Dawkins and his cousin, a lieutenant of the Talbot, to whom we had written, informing them of our hopes of success; but their heads would not allow them to mount to the head or neck. After dinner, as it was getting dark, I screwed up my nerves, and climbed up to our queer little nest at the top, followed by Tom Keppel and a negro, who carried some dry wood and made a fire in a cleft under the rock. Lloyd and Phillpotts soon came up, and we began to arrange ourselves for the night, each taking a glass of brandy to begin with. I had on two pair of trousers, a shooting waistcoat, jacket, and a huge flushing jacket over that, a thick woollen sailor's cap, and two blankets; and each of us lighted a cigar as we seated ourselves to wait for the appointed hour for our signal of success. It was a glorious sight to look down from that giddy pinnacle over the whole island, lying so calm and beautiful in the moonlight, except where the broad black shadows of the other mountains intercepted the light. Here and there we could see a light twinkling in the plains, or the fire of some sugar manufactory; but not a sound of any sort reached us except an occasional shout from the party down on the shoulder (we four being the only ones above). At length, in the direction of Port Louis, a bright flash was seen, and after a long interval the sullen *boom* of the evening-gun. We then prepared our pre-arranged signal, and whiz went a rocket from our nest, lighting up for an instant the peaks of the hills below us, and then leaving us in darkness. We next burnt a blue-light, and nothing can be conceived more perfectly beautiful than the broad glare against the overhanging rock. The wild-looking group we made in our uncouth habiliments, and the narrow ledge on which we stood, were all distinctly shown; while many of the tropical birds, frightened at our vagaries, came glancing by in the light, and then swooped away, screeching, into the gloom below; for the gorge on our left was dark as Erebus. We burnt another blue-light, and threw up two more rockets, when, our laboratory being exhausted, the patient-looking, insulted moon had it all her own way again. We now rolled ourselves up in our blankets, and, having lashed Phillpotts, who is a determined sleep-walker, to Keppel's leg, we tried to sleep; but it blew strong before the morning, and was very cold. We drank all our brandy, and kept tucking in the blankets the whole night without success. At day-break we rose, stiff, cold, and hungry; and I shall conclude briefly by saying, that after about four or five hours' hard work, we got a hole mined in the rock, and sunk the foot of our twelve-foot ladder deep in this, lashing a water-barrel, as a landmark, at the top; and, above all, a long staff, with the union-jack flying. We then, in turn, mounted to the top of the ladder to take a last look at a view such as we might never see again; and, bidding adieu to the scene of our toil and triumph, descended the ladder to the neck, and casting off the guys and hauling-lines, cut off all communication with the top."

We have only to add to this animated description that, more fortunate than Peter Botte, Lieutenant Taylor and his friends effected their descent in perfect safety. The warm congratulations of their countrymen greeted them on their return from what our readers will probably agree with us in regarding as one of the most brilliant enterprises of this sort which have ever been recorded.

Eminence attained by Men of low Origin.—Many of the most eminent men in literature, science, and art have sprung up in obscurity. Some will instantly occur to the mind from among the living as well as the dead who have laid society under the deepest obligations; but there are others whose claims are not so commonly remembered. It is calculated, for instance, that above a million and a half chaldron of coals are annually consumed in London; and the amazing extension of the coal trade to meet such demands is to be traced to men called "viewers," who have generally raised themselves from lower situations. Machinery was absolutely necessary to obtain so many millions of tons of one of the first necessaries of life, and that at a rate exceedingly low, and this was provided by Newcomen the plumber, and Smeaton and Watt the watchmakers. The cheap and elegant garments, which give bread to about two millions of people, instead of fifty thousand, which raised the importation of cotton wool from less than 2,000,000 to 200,000,000 pounds per annum, and which increased the annual produce of the manufacture from £200,000 to £36,000,000, are to be traced through subsequent improvements, to Arkwright and Crompton the barbers. A rude and inconsiderable manufacture was changed into an elegant art, and an important branch of national commerce, by Wedgewood the potter.

Inland navigation, which enabled manufacturers to import the raw materials and export the finished goods, was devised and executed by Brindley the mill-wright; and it would be easy to accumulate a great number of instances in which persons of humble grade have greatly promoted the general good.—*Wilderspin's Early Discipline*, p. 263.

MAGNA CHARTA.



[Magna Charta Island.]

THE term Magna Charta is still a sound as familiar to the ears of all classes of Englishmen, as it has been to those of their forefathers for six hundred years. A good many persons, however, are probably more familiar with the sound than with the sense of the expression, and may be glad to have a short account of what Magna Charta is.

John (the sixth son of Henry II., and the great-great-grandson of the Conqueror), who obtained the throne in 1199, on the death of his brother Richard I. (Cœur de Lion), was one of the most unprincipled and profligate characters in the line of our kings. If he did not owe his crown to an act of usurpation (for it would be unfair, considering the then unsettled state of the law of succession, to say that the claim of Arthur of Brittany, the son of his elder brother Geoffrey, was clearly better than his), there is at least every reason to believe that he did not scruple to secure it by the murder of his young nephew. The rest of his reign was worthy of its bad beginning. During the short intervals of prosperity which he enjoyed, he showed himself a licentious and heartless despot; but for the most part he only escaped from one disaster to be overtaken by another, till poison, or, as other accounts say, a broken heart, brought him to an untimely grave. He was stripped of the possessions of his ancestors on the Continent by the King of France; he was afterwards obliged to resign even his realm of England to the Pope; and, finally, he was beaten in a contest with his own subjects, and forced to accept of such terms as they chose to dictate. On all these occasions of adverse fortune, he demeaned himself with an abjectness equal to the arrogance which he displayed at other times; and no shift was ever either too mean and perfidious on the one hand, or too impudent on the other, for him to avail himself of, as soon as an opportunity offered, to escape from his engagements. With all this want of principle, however, John was not without qualities fitted to give him an ascendancy over the popular mind. He was far from being deficient in the martial spirit and personal courage of his race; ill-directed as they were, his intellectual powers seem to have been acute and vigorous; and he could put on, when he chose, an affability of manner which took the multitude. Probably the truest picture we have of him is that which has been drawn by Shakspeare. Our great dramatist, who knew so well how to put life into the dead forms of history, has represented him as selfish, unscrupulous, and cruel, but at the same time as displaying eminent ability, and a bravery worthy of a better cause.

It was in the year 1214, soon after John had become reconciled to the Pope, and had delivered himself from excommunication, by consenting to hold his kingdom as a vassal to the see of St. Peter, that his renewed excesses of tyranny and oppression at length aroused against him the general indignation of his subjects, and determined them to take measures for the recovery of their liberties. There never was a more complete subjugation of any people than that of the Saxons of England by their Norman invaders. Not only was the vanquished country deprived of its political independence; the inhabitants, individually, were stripped of their property, and reduced almost to a state of slavery. In twenty years after William's accession probably nine-tenths of the land in England had been transferred to the possession of Normans. It was a hundred years after that event before any person of that nation was preferred to any public office or employment. During the whole of this period the native English were treated by their foreign masters almost as an inferior race.

The Saxons, however, still formed the great body of the population. The Conqueror's military followers, although numerous enough to secure him the crown, and also in a short time to appropriate all the landed estates in England, were quite insufficient to supply the country with a new population. The consequence was that England remained England notwithstanding this subjugation. The Saxon blood and the Saxon tongue, although all was done for a long series of years that a tyrannical policy could do to tread both into the earth, were too strongly rooted to be thus destroyed, and both eventually rose and reclaimed their old inheritance. We are, in by far the greater part, Saxons in language and lineage to this day.

The intermixture of the two races, or rather the absorption of the foreigners into the mass of the native population, must have commenced in the course of the first half century after the conquest; and, by the time of John, the process must have been carried to a consi-

derable length. This was the way in which the English re-conquered their conquerors. It is indeed surprising to find how early the national sentiment, which was thus generated, assumed entirely an English tone. It was for the rights and privileges of Englishmen that every struggle was waged which the subject carried on with the sovereign. The Normans themselves never demanded the restitution of any thing Norman. The universal cry already was for the old laws and institutions of Saxon England—for the liberties which the country had enjoyed in the time of Edward the Confessor. And to the perseverance with which this cry was urged, and the success with which it was at length crowned, it is owing that at this day our laws, as well as our blood and our language, are mainly Saxon.

The heart of the nation, then, being thus set upon the recovery of its ancient freedom, a large body of the nobility, having made various previous arrangements, assembled towards the close of the year 1214, and probably, as Judge Blackstone thinks, on the 20th of November, being St. Edmund's day, in the abbey-church of Bury St. Edmonds, in Suffolk, on pretence of devotion, but in reality to enter into a solemn league against the throne. They swore on the high altar to wage war against the King, until he should agree to their demands. On Epiphany-day (the 6th of January), 1215, they came in a body to London, and immediately sent a deputation to his majesty, who was then lodged in the Temple. Although alarmed at what he perceived to be the strength of the confederacy, John did not at once yield, but requested time to consider their proposals. A respite was granted him till the close of Easter. Meanwhile both parties prepared themselves for the coming contest. But although the King obtained a prohibition against the proceedings of the barons from the Pope, he soon found that this spiritual aid was nearly all upon which he could count. The thunders of the Vatican were never much regarded, either in England or any other country, when directed against a really popular cause; and, in this instance, the admonition and menaces of his Holiness were entirely unheeded. Immediately after Easter, which fell that year on the 19th of April, the barons had assembled at Stamford in Lincolnshire with a numerous army; the Pope's letters arrived the following week; but on Monday, the 27th, the insurgents marched to Brackley in Northamptonshire, and there encamped, about fifteen miles from Oxford, where the King was.





[Copy of the Seal of King John to the agreement with the Barons.]

[Fac-simile of the writing of Magna Charta.]

A deputation soon arrived from John desiring to know the reason of their assembling; to which they made answer by a written exposition of their demands, accompanied with an intimation that they would immediately proceed to seize the royal castles in the event of their suit not being complied with. Nothing definitive, however, resulted from these negotiations.

The barons, then, looking to the speedy commencement of warlike operations, chose one of their number, Robert Fitzwalter, the general of their army, under the title of Marshal of the army of God and of Holy Church. On the 5th of May, at Wallingford (other authorities say at Reading), they solemnly threw off their allegiance to the King. They then attacked the castle of Northampton, from which they were repulsed; but they took that of Bedford; and, marching thence to London, were admitted by the citizens, on Sunday the 24th (or as others say the 17th) of May.

By this time the King seems to have become convinced that further resistance would be vain. All had deserted him except seven lords, accompanied by whom he had retired to Odiham in Hampshire. In these circumstances he sent a message to the confederated barons, promising compliance with their wishes, and soliciting a conference.

Tuesday, in Whitsuntide, being the 9th of June, was accordingly appointed as the day on which the two parties should meet to settle their differences, in the plain of Runnemede, which happened to lie about half way between Odiham and London. On the 8th the King came to Merton in Surrey, and there granted letters of safe-conduct to the barons. But it was afterwards agreed to defer the meeting till the Monday following, and in the mean time the King went to Windsor. On that day, being Trinity Monday, the 15th of June, the sovereign and his revolted subjects took their places

opposite to, and at some distance from, each other on the appointed ground. The barons came in great numbers; but John was accompanied only by a few followers.

Runnemede, or Runneymead, which these proceedings have made for ever famous, is a large plain on the southern bank of the Thames, in the parish of Egham in Surrey. It lies between the river and the town of Egham. During the last week of August it is used as a race-ground; and the races seem to be of considerable antiquity. Hence the name has been supposed by some to mean Running Mead; but it is much more probable that it means the Mead of Council, from the Saxon *Rune*, it having, as our old historians state, been frequently before this the scene of conferences and debates on public affairs.

The proceedings on the present occasion appear to have been commenced by the barons submitting their demands to the King, drawn up in the form of preliminary articles of agreement, to which his majesty affixed his seal. This interesting document is now in the British Museum. The seal attached to it is in a much more perfect state of preservation than those belonging to any of the still existing copies of the charter itself; and from it, accordingly, the representations in the preceding page have been taken.

These articles seem to have been then embodied in the form of a charter, being that which is commonly entitled the *Magna Charta Communium Libertatum*, or Great Charter of the Common Liberties. Both documents are dated the 15th of June; but it is stated by various authorities, that the charter was not actually signed till the 19th. There is also a tradition that that ceremony did not take place on the plain of Runnemede, but on a neighbouring isle in the Thames, still known from the circumstance by the name of Magna Charta, or Charter, Island. A view of this island is given at the head of the present article.

Copies of the charter were sent after its signature to each county, or at least to each diocese, in England; but of these, we believe, only three are now known to exist. Two are in the Museum, having formed part of the collection of Sir Robert Cotton, by whom one of them is said to have been recovered from the hands of a tailor, when he was in the act of proceeding to cut down the parchment for measures. They are slightly injured by a fire which consumed a part of the Cottonian Library, before it was removed to its present depository; the waxen seal which is attached to one of them having been partly melted by that accident. The other has only the slits by which the seal had been formerly fastened to it. There is a third copy in the Library of the Cathedral of Salisbury.

The Great Charter, having been extorted chiefly by the power of the clergy and the nobility, contained, as was to be expected, various provisions highly favourable to the interests of both these classes. But these we shall not at present stop to consider. The more important and more interesting parts are those that refer to the body of the people. It is however to be recollected, that at this time probably the great majority of the inhabitants of England were still in what was called a state of villainage, that is to say, were the bondsmen and property of the landed proprietors upon whose estates they lived. The first great cause which operated in bringing about the extinction of villainage was the rise of towns. It was a privilege early granted to burghs in England, that any slave taking refuge in one of them, and residing there for a year and a day, became thereupon free. These free towns or burghs accordingly were, at the time when Magna Charta was granted, the only places in the kingdom where any considerable number of the commonalty was to be found not in a state of bondage. To the clauses of the charter, therefore, which refer to the towns, we are principally to look for the degree in which it established or extended popular freedom. None of the parties concerned in the transaction, certainly, entertained any idea of a general emancipation of the villains. Those composing this part of the population were universally considered as mere goods or chattels, and as such not comprehended in the community at all. By one of the articles indeed of this very charter of the common liberties, the labourers by whom the land was cultivated are classed along with the cattle and instruments of husbandry; the guardian of an heir who is a minor, it is declared, shall manage his estate without destruction and waste either of the men or goods. It is undeniable, therefore, that Magna Charta neither abolished slavery in England, nor contained any provision tending in that direction; and it may therefore in one sense be asserted to have left the great body of the people in the same condition in which it found them. But in regard to the free population this is not a correct statement. One of the clauses assures to all cities, burghs, towns, and ports the enjoyment of their liberties and free customs both by land and water, for which till now they had been all regularly in the practice of paying a yearly tax or bribe to the crown. A considerable part of the royal revenue was derived from this source. Other articles promulgated various enactments decidedly favourable to the interests of commerce.

But the article of Magna Charta which is to be considered as most valuable in reference to the general liberties, for the sake both of the actual securities which it established, and the principles of which it involved the acknowledgment and proclamation, is that of the original of which we have given a fac-simile in the preceding page: "Nullus liber homo capiatur, vel imprisonetur, aut dissaisietur, aut utlagetur, aut exuletur, aut aliquo modo destruatur; nec super eum ibimus, nec super eum mittemus, nisi per legale judicium parium suorum vel per legem terre. Nulli vendemus, nulli negabimus, aut differemus rectum aut judicium." That is to say, in English, "No freeman shall be apprehended, or imprisoned, or disseised (deprived of any thing he possesses), or outlawed, or banished, or any way destroyed, nor will we go upon him, nor will we send upon him (pronounce sentence against him, or allow any of the judges to do so), except by the legal judgment of his peers, or by the law of the land. To none will we sell, to none will we deny, to none will we delay right or justice." This solemn recognition of the liberty of the subject at once laid, broad and deep, the foundations of a free constitution. Sir Edward Coke, we may remark, considered this clause to refer to all orders of the population equally, including even the villains, who, he argued, although bondsmen in relation to their masters, were free in so far as all others are concerned; but the principle involved in the concession was of more importance, eventually at least, than the extent to which it became immediately operative. The principle was, that the subject had his rights as well as the sovereign, and that those of the one were as sacred as those of the other. There could be no absolute despotism so long as this principle was maintained. Vices in the government and in the constitution there might be still; but, at least, the unlimited power of the monarch was struck down and destroyed for ever. Magna Charta was therefore a great revolution upon the form of government established at the Conquest, and which had been maintained ever since that event. Up to the time of this charter every one of the wrongs which the article we have quoted condemns and declares shall no longer be tolerated, had been in constant use by the crown as engines of extortion and oppression. The actual relief, therefore, which the charter conferred was far from inconsiderable. But it was, in addition to this, the first blow given to the uncontrolled power of the crown, established by the Norman Conquest,—the first advantage which

the country gained and made good against the iron rule to which it was then subjected. And even what it left imperfect it gave the means of perfecting. It is upon this rock that our free constitution, as gradually evolved and completed in subsequent times, may be looked upon as having been reared.

PASCAL.

The 19th of June is the birth-day of Blaise Pascal, who was born at Clermont, the capital of Auvergne in France, in the year 1623. This extraordinary genius affords one of the most remarkable examples on record of intellectual precocity, and of great progress in knowledge achieved even without the aid of a master. His father, who had been president of the provincial Court of Aids, had retired from that office and come with his family to Paris, principally that he might devote himself to the education of his son. From his earliest years the boy had manifested both a singular solidity and quickness of parts—not only inquiring, as most lively children will do, the reason of every thing, but showing a perfect capacity of distinguishing between a true explanation and one which consisted, as too many explanations given to children do, in merely substituting one set of words for another. Such verbal tricks or subterfuges never succeeded with Pascal. So surprising was the evidence which he gave in this way, of a searching, considering, and combining head, that his father was actually alarmed at it, and resolved to keep all knowledge of the mathematics from him, lest that science of pure reason should engross his affections to the exclusion of all other learning. The natural bent of his genius, however, was too strong to be thus controlled. He had already begun to investigate for himself the phenomena of physical nature. One day when he was only in his eleventh year his attention was struck while sitting at dinner by the sound emitted from a plate which some one had struck by accident with a knife, and especially by its instant cessation when the plate was touched with the hand. He immediately began to reflect and experiment upon the subject; and he had soon noted down so many facts and observations as formed a little treatise, the soundness as well as the ingenuity of which was considered by good judges to do him great credit. He now began to importune his father to teach him mathematics; but all the information the latter would give him was merely an explanation, at his earnest request, of the general nature and objects of the science. Such a hint was enough for the inventive genius of this wonderful boy. "He forthwith," says one of the writers of his life (the author of the Preface to his Treatise on the Equilibrium of Fluids), "began meditating on the subject during his hours of recreation; and being alone in the apartment in which he was accustomed to play, he took a bit of charcoal and drew figures upon the floor, endeavouring, for example, to discover the way of making a circle perfectly round, a triangle of which all the sides and angles should be equal, and to perform other such problems. All this he found out very easily; and then he set himself to ascertain the proportions of different figures to each other. In pursuing these inquiries he called a circle a *round*, a line a *bar*, and named the other figures in the same manner. From this he proceeded to axioms, and finally to demonstrations; and, thus left entirely to himself, he actually made his way to the proposition (the 32d of the 1st book of Euclid), of which it is the object to show that the three angles of any triangle are equal to two right ones. When he had arrived at this stage of his progress, his father by chance entered the room where he was, and found him so absorbed in his diagrams that it was a considerable time before he perceived that any one was present. His father's surprise may be conceived when, in answer to the first question he asked him, the boy told him that he was endeavouring to prove the proposition we have mentioned. The further explanations which he received only increased his astonishment, as his son traced to him step by step the manner in which he had advanced to the point where he now was. He quitted the room without being able to utter a word, and proceeding immediately to the house of his intimate friend M. le Pailleux, who was a very able mathematician, he related with much emotion what he had just learned and witnessed. M. le Pailleux was not less surprised than he himself had been, and implored his friend no longer to endeavour to repress so strong a disposition to the cultivation of science, but at once to permit his son to have access to the requisite books. Overcome by this reasoning, M. Pascal immediately put Euclid's Elements into the hands of the boy, who was as yet only twelve years of age. Never did any young person read a romance with more avidity and more ease than Pascal read his Euclid, now that he had got hold of it." The result, the writer goes on to inform us, was, that he now appeared regularly at the weekly meetings held by the most eminent scientific men then in Paris; nor were the new observations which he contributed either less numerous or of less value than those of any of his associates. Still it was only his hours of recreation which his father allowed him to devote to geometry. The principal part of his time continued to be occupied in the study of the languages. His progress in science, however, was so great, that at sixteen he wrote a book on conic sections, with the depth and general excellence of which Descartes was so much struck that he would scarcely believe that it had not been written by the father instead of the son. At nineteen he invented his famous machine for performing arithmetical calculations, a contrivance of wonderful ingenuity. Some years after he followed up and completed the grand discoveries of Galileo and Torricelli on the weight of the air, by proving experimentally that the mercury in the barometer fell on the instrument being carried to an elevated situation, the balancing atmospheric column being thereby diminished. But Pascal's bodily constitution had from his birth been one of great delicacy, and the ardour with which he had pursued his studies at length began to tell upon his health with alarming effect. Neither the advice of his physicians nor the entreaties of his friends were able to draw him from his books; and his exquisitely susceptible mind soon exhibited symptoms of being not unaffected by the shattered condition of its tenement. His piety, which had always been deep and earnest, now assumed a character of gloom and melancholy, which was permanently impressed upon it by an accident that befel him as he was one day riding in his carriage along the Pont de Neuilly. The horses becoming unruly at a part of the bridge where the parapet was wanting, plunged into the Seine, and he only escaped being dragged along with them to instant destruction by the traces breaking. From this moment he renounced the world, and gave himself up to preparation for that death by which he had been so nearly overtaken. Still, however, the light of his noble genius, although eclipsed, was not extinguished. It was after these new fancies had attacked him that he solved the difficult problem of determining the curve described by any particular point in a revolving wheel, known among mathematicians by the name of the cycloid. It was also long after this that he composed his celebrated Provincial Letters (as they have been called) against the Jesuits, a splendid work, which has perhaps contributed more to his fame among general readers than any thing else he has done, and which is universally acknowledged to have placed him in the very first rank of the classic writers of his country. The work called his 'Thoughts,' likewise, was the product of this season of gloom and delusion,—being made up

of detached remarks which he was in the habit of committing to bits of paper as they occurred to him. At length, after a long illness, brought on and fed by the most pitiable mortifications, in the course of which he was wasted to a shadow, the last thread of life gave way on the 19th of August, 1662, when the amiable and gifted enthusiast had little more than completed the thirty-ninth year of his age.

Spring.—The following description of spring almost grown into summer, is by Gawain Douglas, Bishop of Dunkeld, who lived in the latter end of the fifteenth and beginning of the sixteenth centuries, and modernized by Dr. Warton. "Fresh Aurora issued from her saffron bed and ivory house. She was clothed in a robe of crimson and violet colour; the cape vermilion, and the border purple. She opened the windows of her handsome hall, overshadowed with roses and filled with balm or nard. At the same time the crystal gates of heaven were thrown open to illumine the world. It was glorious to see the winds appeased, the sea becalmed, the soft season, the serene firmament, the still air, and the beauty of the watery scene. The silver-scaled fishes, in the gravel gliding hastily, as it were, from the heat, or seen through clear streams, with fins shining brown as cinnabar, and chisel-tails darted here and there. The new lustre enlightening all the land, beamed on the small pebbles on the sides of rivers, and on the strands, which looked like beryl, while the reflection of the rays played on the banks in variegated gleams. The bladed soil was embroidered with various hues. Both wood and forest were darkened with boughs, which reflected from the ground gave a shadowy lustre to the red rocks. Towns, turrets, battlements, and high pinnacles of churches, castles and of every fair city, seemed to be painted; and, together with every bastion and story, expressed their own shapes on the plains. The glebe, fearless of the northern blasts, spread her broad bosom. The corn-crops and the new-sprung barley reclothed the earth with a gladsome garment. The variegated vesture of the valley clothed the cloven furrow, and the barley-lands were diversified with flowery weeds. The meadow was besprinkled with rivulets, and the fresh moisture of the dewy night restored the herbage which the cattle had cropped in the day. The blossoms in the blowing garden trusted their heads to the protection of the young sun. Rank ivy leaves overspread the walls of the rampart. The blooming hawthorn clothed all the thorns in flowers. The budding clusters of the tender grapes hung end-long, by their tendrils, from the trellices. The germs of the trees unlocking, expanded themselves into the foliage of nature's tapestry. There was a soft verdure after balmy showers. The flowers smiled in various colours on the bending stalks; some red, others marked like the blue and wavy sea, speckled with red and white, or bright as gold. The daisy embraided her little coronet. The grass stood embattled with banewort; the seeded down flew from the dandelion. Young weeds appeared among the leaves of the strawberries and gay gilliflowers. The rose-buds, putting forth, offered their red vernal lips to be kissed; and diffused fragrance from the crisp scarlet that surrounded their golden seeds. Lilies, with white curling tops, showed their crests open. The odorous vapor moistened the silver webs that hung from the leaves. The plain was powdered with round dewy pearls. From every bud, scion, herb, and flower bathed in liquid fragrance, the bee sucked sweet honey. The swans clamoured amid the rustling reeds, and searched all the lakes and grey rivers where to build their nests. The red bird of the sun lifted his coral crest, crowing clear among the plants and bushes, picking his food from every path, and attended by his wives Tappa and Partlet. The painted peacock with gaudy plumes unfolded his tail like a bright wheel enshrouded in his silver feathers, resembling the marks of the hundred eyes of Argus. Among the boughs of the twisted olive, the small birds framed the artful nest, or along the thick hedges, or rejoiced with their merry mates in the tall oaks. In the secret nook, or in the clear windows of glass, the spider full busily wove her sly net to ensnare the gnat or fly. Under the boughs that screen the valley, or within the pale-enclosed park, the nimble deer trooped in ranks, the harts wandered through the thick wood shaws, and the young fawns followed the dappled does; kids slipped through the briars after the roes, and in the pastures and leas the lambs bleated to their dams. The ring-dove coos in the tall copse; the starling whistles her varied descant; the sparrow chirps in the clefted wall; the goldfinch and linnet fill the skies; the cuckoo cries; the quail twitters; while rivers, shaws, and every dale resound; and the tender branches tremble on the trees, at the song of the birds and the buzzing of the bees."

Human Life.—Pliny has compared a river to human life. I have never read the passage in his works, but I have been a hundred times struck with the analogy, particularly amidst mountain scenery. The river, small and clear in its origin, gushes forth from rocks, falls into deep glens, and wantons and meanders through a wild and picturesque country, nourishing only the uncultivated tree or flower by its dew or spray. In this, its state of infancy and youth, it may be compared to the human mind, in which fancy and strength of imagination are predominant—it is more beautiful than useful. When the different rills or torrents join, and descend into the plain, it becomes slow and stately in its movements; it is applied to move machinery, to irrigate meadows, and to bear upon its bosom the stately barge; in this mature state it is deep, strong, and useful. As it flows on towards the sea, it loses its force and its motion, and at last, as it were, becomes lost and mingled with the mighty abyss of waters.

One might pursue the metaphor still further and say, that in its origin, its thundering and foam, when it carries down clay from the bank and becomes impure, it resembles the youthful mind, affected by dangerous passions. And the influence of a lake in calming and clearing the turbid water may be compared to the effect of reason in more mature life, when the tranquil, deep, cool, and unimpassioned mind is freed from its fever, its troubles, bubbles, noise, and foam. And, above all, the sources of a river, which may be considered as belonging to the atmosphere, and its termination in the ocean, may be regarded as imaging the divine origin of the human mind, and its being ultimately returned to and lost in the Infinite and Eternal Intelligence from which it originally sprung.—*Davy.*

The Trout.—The varieties of the common trout are almost infinite; from the great lake trout, which weighs above sixty or seventy pounds, to the trouts of the little mountain brook, or small mountain lake, or tarn, which is scarcely larger than the finger. The smallest trout spawn nearly at the same time with the larger ones, and their ova are of the same size; but in the large trout there are tens of thousands, and in the small one rarely as many as forty,—often from ten to forty. So that in the physical constitution of these animals, their production is diminished, as their food is small in quantity; and it is remarkable that the ova of the large and beautiful species which exist in certain lakes, and which seem always to associate together, appear to produce offspring, which, in colour, form, and power of growth and reproduction, resemble the parent fishes, and they generally choose the same river for their spawning. Thus in the lake of Guarda, the Benacus of the ancients, the magnificent trout, or *Salmo fario*, which in colour and appearance is like a fresh run salmon, spawns in the river at Riva, beginning to run up for that purpose in June, and continuing to do so all the summer; and this river is fed by streams from snow and glaciers in the Tyrol, and is generally foul: whilst the small spotted common trouts, which are likewise found in this lake, go into the small brooks, which have their sources not far off, and in which, it is probable, they were originally bred. I have seen taken in the same net, small fish of both these varieties, which were as marked as possible in their characters; one silvery, like a young salmon, blue on the back, and with small black spots only; the other, with yellow belly and red spots, and an olive-coloured back. I have made similar observations in other lakes, particularly in that of the Traun near Gmünden, and likewise at Loch Neah in Ireland. Indeed, considering the sea trout as the type of the species *trout*, I think all the other true trouts may not improperly be considered as varieties, where the differences of food and of habits have occasioned, in a long course of ages, differences of shape and colours, transmitted to offspring in the same manner as in the variety of dogs, which may all be referred to one primitive type.—*Davy.*

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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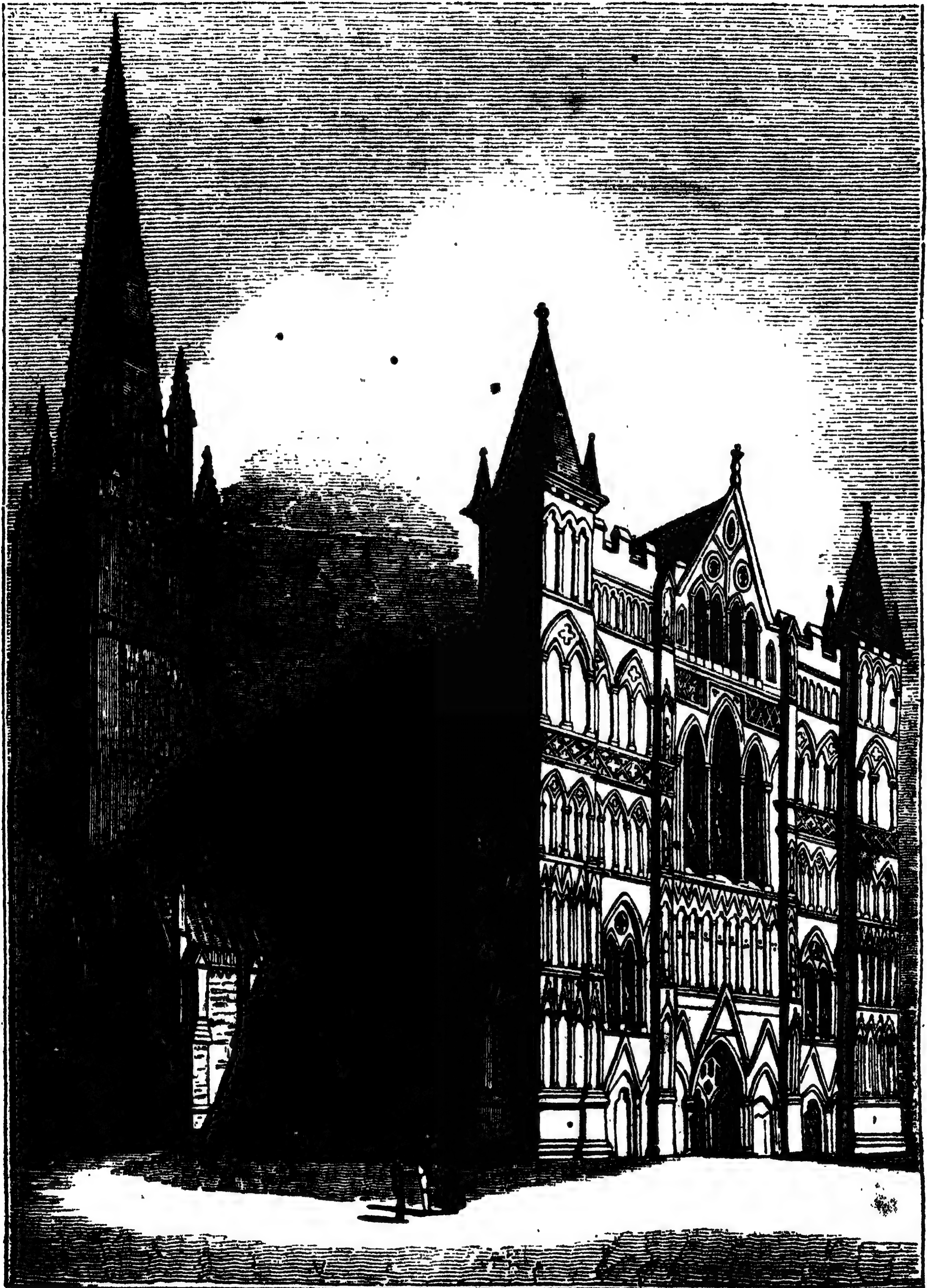
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CATHEDRAL OF SALISBURY.



[North-west view of Salisbury Cathedral.]

CATHEDRAL OF SALISBURY.

THIS is in some respects the most imposing structure among our English cathedrals. It is, in the first place, seen to great advantage, being, on three of its sides, unencumbered by the juxta-position or close vicinity of any other buildings, and on the remaining or south side having only attached to it its own cloisters and chapter-house. Then the lofty spire which rises from its centre is an erection unequalled by any thing else of the same kind in England; and cannot, on the first view at least, be viewed shooting upwards and piercing the sky without the deepest emotions of wonder and admiration. The external aspect of the building generally, indeed, is noble and striking. Its interior, also, without possessing either the richness or grandeur of some of our other cathedrals, is in a high degree beautiful and impressive.

The longer bar of the cross forming the structure, consists, as in other cathedrals, of a nave, with side aisles, a choir, and a lady chapel, taking its parts in order from west to east. The screen between the lady chapel and the choir was taken away when the choir was restored by Wyatt, which has produced a very bad effect. At the end of the lady chapel is a large painted window. Besides the greater transept, the cathedral is crossed farther to the east by another of smaller dimensions; and, on the opposite side, the north wall is also broken by a projection forming a porch, the architecture of which is of a very bold and majestic character. The façade of the west front forms nearly a square, and is, as usual, elaborately adorned by niches, statues, tracery, buttresses, and other varieties of decoration. Many of the statues have evidently been destroyed by violence; the drapery of some that partly remain possesses a high degree of excellence. Over the central door is a large window, divided into three compartments, the middle one rising considerably beyond the height of the other two. The length of this front is 112 feet; but the line is extended for 217 feet farther to the south by the west wall of the square forming the cloisters, which, as already mentioned, is attached to the south wall of the cathedral. East from this square, and communicating with it by a passage, is the chapter-house, an octagonal building of 58 feet in diameter, by 52 in height, round the interior of which are the remains of a border of curious paintings representing scripture subjects. The extreme length of the church externally is 474 feet, and that of the transept 230 feet. The height from the floor of the nave to the roof is 81 feet. But the glory of Salisbury Cathedral is its great central tower, with the sharp-pointed spire by which it is crowned. The entire height of this erection is 404 feet, being exactly twice that of the Monument in London. It is the highest building of stone in England, although the old spire of St. Paul's, which was burnt down in 1561, is said to have risen to the altitude of 520 feet. But that was of wood. The height of the present St. Paul's, reckoning from the floor of the church to the lantern, is only 330 feet. The tower of Salisbury Cathedral up to the point at which the spire commences is adorned with pilasters, columns, pinnacles, and other decorations. The spire has been a subsequent erection. It is stated by Mr. Francis Price, in his work entitled 'A Series of Observations on the Cathedral Church of Salisbury' (1753), that, in order to enable the tower to sustain this additional weight, a hundred and twelve additional supports, besides bandages of iron, had been introduced into it, several windows by which it was formerly perforated having also been filled up, and the foundations considerably deepened and extended. The entire column in settling has swerved somewhat to the south and west, the summit of the spire being 22 inches out of the perpendicular, and the columns at the four angles of the tower in the cathedral are much warped; but it may be considered to be still, notwithstanding this, as secure and nearly in as perfect a condition as when it was first erected.

With the exception of the spire, this fine old cathedral is almost entirely the work of the 13th century. The episcopal see of Salisbury was originally fixed at Sherbourne in Dorsetshire, from which it was only removed in the year 1072. Herman de Lotharingia, the then bishop, began the building of a cathedral at Old Sarum, and dying in 1077, left the work to be carried on by his successor Osmund, by whom it was finished, and dedicated to the Virgin, in 1092. This church stood upon a rising ground, within the bounds of the castle which then existed at Sarum; and in no long time disputes respecting jurisdiction appear to have arisen between the civil and ecclesiastical authorities. It would seem to have been principally on this account that the desire began to be entertained by the bishop and his clergy of transferring the cathedral to some other place. A bull, accordingly, having been obtained from the Pope in 1219 to sanction the design, a wooden chapel was in the first instance erected on the ground occupied by the present cathedral, being a low field lying about a mile to the south-east of the ancient church, at the confluence of the Avon and the Nadder, and then known by the name of the Merryfield. The bishop at this time was Herbert, or, as he is called by other authorities, Robert Poore. The foundation of the present cathedral was laid on the 28th of April, in the following year. Poore died in 1229, but the building was carried on by his successors in the see, Robert Bingham, William de Yorke, and Giles de Bridport: by the last of whom it was brought to a close about the year 1260. The upper part of the tower and the spire, however, were added afterwards, and probably, as Mr. Britton thinks, in the time of Bishop Robert de Wyvile, who occupied the see from 1329 to 1375. Soon after the cathedral had been begun, and when the bishop, the clergy, and their tenantry, had built houses, and established themselves around it, Henry III. granted them a charter, declaring New Salisbury (or Saresbury) a free city, and giving them leave to enclose it with competent walls and ditches, that it might be secure from the incursions of robbers, and all other hostile attacks. The power thus raised in opposition to that of the neighbouring fortress, seems to have rapidly acquired the superiority over its rival; for in the time of Bishop Wyvile, the castle and cathedral of Old Sarum were ordered by Edward III. to be entirely destroyed, and the stones to be employed in the augmentation and improvement of the new one. It was probably with some of these stones that the spire was built. Old Sarum, which was the capital of the west of England under the Saxons, a station of the Romans, and in all probability a British town before the arrival of these invaders, was from this time nearly deserted; yet about a century ago it is said to have still contained ten or twelve inhabited houses. It is now wholly uninhabited, and only a few bits of the wall remain. The trenches and earth-works around it, however, are of prodigious size, and unchanged: it is a fine specimen of an old encamped station, the plan of which is as perfect as if the works were standing. The Reform Bill, by depriving Old Sarum of its privilege of returning two members to parliament, took from it the last remaining sign of its ancient importance.

BATTLE OF BANNOCKBURN.

THE 24th of June is the anniversary of the battle of Bannockburn, and as such would well deserve to be set among the high tides in a calendar which should record the victories of freedom and the triumphs of right over might. The sudden death of the King of Scotland, Alexander III., by a fall from his horse in 1286, followed, as it was four years after, by that of his granddaughter, the Maiden of Norway, to whom the crown

had descended, left that country exposed to all the evils of a disputed succession. The line of William I., called the Lion, was now extinct; and the heir to the throne was to be sought for among the descendants of his younger brother David, Earl of Huntingdon. Of these there were two, John Baliol, the grandson of the Earl's eldest daughter, and Robert Bruce, the son of the second, who both put forward their claims on different grounds. At this time the English throne was occupied by the politic and ambitious Edward I., who, from the moment when he heard of the death of Alexander, seems to have set his heart on the project of annexing the dominions of the deceased king to his own.

He was not long without a plausible excuse for interfering in Scottish affairs. The two competitors for the crown, according to a custom common in that age, agreed to refer their claims to his arbitration. This was a golden opportunity for Edward. Inviting the states, or parliament of Scotland, to meet him at a place on the south side of the Tweed, he there astonished and confounded them by announcing his claim to be considered as the superior and liege lord of that kingdom. A numerous army close at hand rendered resistance for the present impossible. Edward then nominated Baliol to occupy the vacant throne as his vassal.

But this was but a step towards the consummation at which he aimed. He soon created a new pretence for making a still more undisguised attempt to take the sovereignty of Scotland into his own hands. We cannot relate at length the events which followed. The oppressions of the English government at length kindled a spirit of resistance in the conquered nation, which broke out into fierce and unquenchable insurrection. In a few months, roused and directed by the illustrious Sir William Wallace, the Scots chased the foreigners from their soil, and regained their independence; but Edward, overrunning the country with another mighty army, soon reduced them once more under the yoke. In 1305 the heroic Wallace, being betrayed into the hands of his enemies, was carried to London, and there put to death; but it was not long before a new leader appeared to take the place of the murdered patriot. This was Robert Bruce, the grandson of him who had been competitor for the crown with Baliol. Flying from the court of England, where he had hitherto resided, Bruce no sooner made his appearance in Scotland than his friends in great numbers rallied around him, and he was crowned at Scone on the 27th of March, 1306. He might not, however, by this bold enterprise have succeeded in delivering his country, but for an event which soon after took place. While Edward was in the midst of his preparations to avenge this new rebellion, and had advanced as far as Carlisle on his way to the North, he was suddenly taken ill, and died there on the 7th of July, 1307. Before he expired he charged his son, under the pain of incurring his paternal malediction, to carry his body with him into Scotland, and not to bury it until he had effected a complete conquest of that country.

Edward II., however, was a very different character from his father. It was several years before he thought of prosecuting the war which had thus been left upon his hands. His first expedition to Scotland was not undertaken till the end of the year 1310, and led to nothing. By the year 1314 Bruce had made himself entirely master of the country, with the exception of the castles of Dunbar, Berwick, and Stirling, which were still in the possession of English garrisons. The last of these fortresses was then accounted the most important military stronghold in the kingdom. Having been besieged by Edward Bruce, the king's brother, in the end of 1313, Philip de Moubray, the governor, had engaged to deliver it up if he should not be relieved by the 24th of June, the feast of St. John the Baptist, in the following year. If Edward therefore was not prepared to lose his last hold of Scotland, there was not now a moment to be lost. It was in this pressing emergency that he at length determined to make a great effort for the recovery of his father's conquests.

When the news of Edward's preparations reached Bruce, he too set himself to meet the crisis as one on the issue of which hung both his own fate and that of his country. With his utmost exertions, however, he could only assemble an army of about thirty-five thousand men. Edward meanwhile was approaching with one of three times that number. In this state of things, the Scottish king drew up his forces on a field, then called the New Park, having the town of Stirling on his left, and the brook (or burn) of Bannock on his right. Here he lay awaiting the enemy, when on the afternoon of Sunday the 23d of June, the immense mass of the English army was seen making its approach.

The encounter commenced that evening. A party of eight hundred English horse, commanded by Sir Robert Clifford, having attempted to throw themselves into the castle, were attacked by Randolph Earl of Murray, the nephew of the Scottish king, and after a sharp and somewhat protracted struggle, driven back with considerable loss. While this affair was going on, also, Bruce performed an exploit in the sight of both armies, admirably calculated to tell in favour of himself and his cause in that age. We allude to his encounter with the English knight, Sir Henry de Bohun, or Boune, who had attacked him, and whom with one stroke of his battle-axe he laid dead at his feet.

After this the armies parted for the night. But it was only to mix again in desperate conflict after the few hours of darkness had passed. We are not going to relate the course of the morrow's fight, which has been often recounted. This was one of the last great battles fought without the aid of gunpowder. Neither the bowmen nor the heavy horse of the English were able to make any impression on the stout and active infantry of the Scots, armed with their battle-axes and spears. In the position so skilfully chosen by Bruce the multitude of Edward's forces only proved an encumbrance. Their confusion was increased by the cavalry falling into a number of pits which Bruce had caused to be dug in a morass that lay on his left, and in which he had placed sharp iron stakes covered over with sod. Finally, the trepidation into which they had been thrown became irretrievable, and was changed into a general rout, on the appearance at a short distance of what appeared to be another army coming up to assist Bruce, but which was in fact merely an unarmed multitude whom he had instructed to present themselves in this manner, displaying banners with which he had provided them. Thirty thousand of the English are said to have been killed on the field and in the pursuit, among whom were two hundred knights and seven hundred esquires. One of those who fell was the young Earl of Gloucester, the King's nephew. Edward himself with difficulty escaped, having rode hard before his pursuers for eighty miles till he gained the castle of Dunbar. Twenty-two barons and sixty knights fell alive into the hands of the Scots. The loss of the latter amounted to only a few hundreds, and scarcely comprised any person of distinction. The booty taken was immense; the monk of Malmesbury estimates it at two hundred thousand pounds. But the most important result of the battle of Bannockburn was the great national deliverance which it was the means of achieving. Now that Scotsmen and Englishmen are united into one people, both may regard the victory, viewed in reference to this one of its consequences, as their own. It would hardly have been less disastrous for England than it would have been for Scotland, if the latter country, by the issue of that day, had been bowed beneath the yoke of slavery, instead of having burst, as she did, her temporary chains, and recovered, never to be again torn from her, her ancient liberties and independence.

THE MOON.—No. 1.



[Telescopic appearance of the Moon.]

THE first subject which will naturally strike our readers, is the wood-cut which precedes this article. It is a representation of the face of the full moon, as magnified in a telescope. The first question is, what do we mean by the *face* of the moon, which, being a round figure, would present various faces, according to the point from which it is seen. Nevertheless, the following is a correct statement of the appearances which our satellite presents when viewed through a telescope.

The face presented by the moon to us is very nearly the same at all times. Sometimes, however, a little more of the western side is visible, sometimes a little more of the eastern; sometimes also there is a little change on the northern edge of the moon, sometimes on the southern. To these little changes, which resemble a slight motion to and fro like that of a pendulum, the name of *libration* has been given.

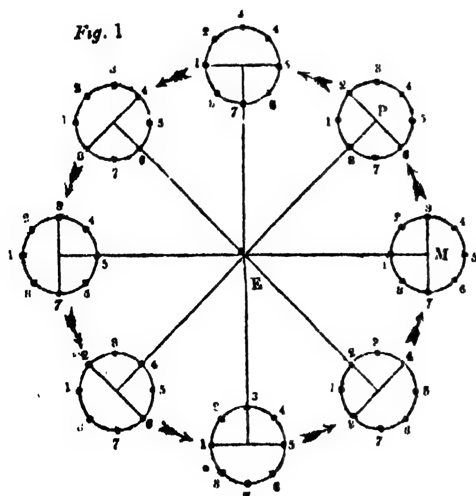
Let us suppose, 1stly, that the moon moves round the earth *uniformly*; 2ndly, in the plane of the ecliptic, that is, that the sun, earth, and moon may be always correctly drawn on the paper, it never being necessary to place either of them above or below, and that the paper represents the plane of the earth's orbit, called the Ecliptic; 3rdly, that the moon itself moves round an axis perpendicular to the plane of the ecliptic in the course of a month; that is, that though the moon moves round an axis, no point which is above the ecliptic ever comes below it, in consequence of this motion. All these suppositions are near the truth: if they were exactly true, and if the time of rotation of the moon were the same as that of its revolution round the earth, the moon would always present the same face, and there would be no libration. The little variations from these suppositions which actually exist, will serve to explain the latter phenomenon.

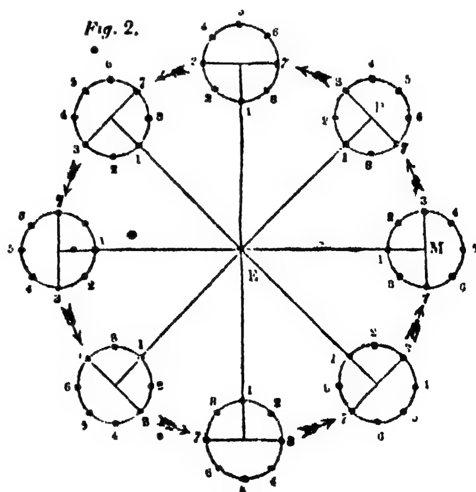
In the diagram of the next page, E is the position of a spectator on the earth, the diurnal motion of which is neglected for the present. The small circles represent the moon, or rather its equator, one hemisphere of the moon being above, and the other below, the paper. The course of the arrow represents the direction of the *orbital* motion round the earth. The axis of the moon is a perpendicular to the paper, drawn through the centre of the lunar equator. On the moon's equator eight spots are marked out, by the figures 1, 2, 3, &c. The left-hand diagram represents the supposition that the moon does not move at all upon its axis, and that on the right-hand makes her always present exactly the same face towards the spectator. We shall now proceed to details.

If the moon does not move at all upon her axis, and we take the position M, the face presented to the earth is 32187, 3 being the eastern, and 7 the western point. When we come to the next position, following the arrows,

[Map of the Moon.]

since the moon has not moved round at all, the spot 3 is still at the top of the figure, but 26 is now the boundary of the face presented to the earth, and 7, which before was only just visible, has advanced considerably towards the east, while 8 is in front of the spectator, instead of 1. Following the moon round the orbit, we see that every spot comes successively in front of the spectator, who will, in the course of an orbital revolution, or *sidereal* month (a term to be hereafter explained), see all the parts of the moon's equator in succession; or at least would see them, if half the moon were always visible, or if it were always full moon. And hence, since the face *is* always the same, we conclude that the moon is *not* without motion on its axis.





We now come to explain the actual appearance observed, viz. that the moon does always present the same face to the spectator. This is represented in fig. 2, where the spot 1 is always in front of the spectator, and 37 is always the boundary of the part of the equator presented to view. Hence, when the moon has moved from M to P through an eighth part of a revolution, the line 37 has also made the eighth part of a revolution, and with it the whole moon, round an axis perpendicular to the paper. This revolution is in the same direction as that of the orbital revolution; for while M moves to P, the point 5 moves to the place occupied by 4 in the second position of fig. 1, where there is no revolution round the axis. The same thing is evident from the succeeding positions, whence we have the following proposition: that if the moon moves round the earth uniformly, the continual presentation of the same face to the earth proves that she revolves upon an axis in the same direction as that in which she moves round the earth and in the same time.

The librations already described prove the errors of the preceding suppositions, and the smallness of the libration proves also the smallness of those errors. The moon does not move uniformly round the earth, but varies her orbital velocity, and also her distance from the earth, the velocity being greatest where the distance is least, and *vice versâ*. Let M be the point at which her distance from the earth is least, or her velocity greatest, and let her move uniformly round her axis in the month as before. She then moves round her axis too slow for the orbital velocity, that is, the lunar day would not be finished in the month if the present rate of orbital motion were kept up. The phenomena arising from this will be in *kind* (though much smaller in *quantity*) the same as those exhibited in fig. 1, in which there is no lunar day at all. That is, some of the western edge of the moon will be thrown into view which was not visible before, and this will continue until the slackening of the orbital motion has brought down the latter to the same as that of the moon on its axis. After this, and up to the point opposite to M, where the orbital rotation is least rapid, the motion round the axis is too quick for the orbital velocity, the western edge begins to disappear, and the eastern to be brought forward, and so on. This alternation is called the *libration in longitude*. Nextly, the axis of the moon is not exactly perpendicular to the plane of her orbit, being about one degree from the perpendicular. This will produce an effect analogous to that observed in the earth from the sun, which is to us the cause of the change of seasons: during one-half the month, the north pole of the moon will be visible, and the south pole during the other. This change at the north and south disc is called the *libration in latitude*.

Lastly, the spectator is not placed at E, the centre of the earth, but rolls round it by the diurnal motion of the earth. This will, in the course of the day, discover a little of the eastern and western edges in succession, which is called the *diurnal libration*. We shall resume the orbital motion in a future paper, and now proceed to say something of the chart of the moon.

The first map of our satellite was given by Hevelius, in the year 1645. It was the result of three or four years' observations. He at first intended to designate the different spots by the names of distinguished astronomers; but fearing the envy of those whom he might think proper to omit, he preferred using the names of places on the earth. His map accordingly presents various ancient names of places on our globe, disposed according to a fanciful resemblance which he imagined he had found. A large round spot not far from the centre represents Sicily: a chain of smaller spots in the interior of this is Mount Etna, and the island fills up the whole centre of the Mediterranean sea, while the Adriatic is a small bay, about half the size of Sicily, looking towards it, and the Peloponnesus, turning round a corner, divides the Ionian Islands from Mount Athos. This method of describing the situation of the spots was superseded by that of Grimaldi and Riccioli, who preferred the first idea which occurred to Hevelius, and from them it has descended to us. Riccioli, a strenuous opponent of the doctrine of Copernicus, amused himself by placing that astronomer and his followers in situations indicative of the fate he predicted to their opinions. Copernicus and Galileo are placed in the part which he called the *Sea of Storms*, while Kepler is the capital of the *Island of Winds*.

The plate at the head of this article is reduced from a beautiful engraving of the moon's surface, drawn by Charles Blunt, Esq., and published by Ackermann and Co. Our drawing has been made by Mr. Blunt himself. It represents the full moon in a state of mean libration; that is, the greatest part which ever can be added to the eastern limb by the libration is just equal to the greatest part which, at other times, the western limb receives. The lunar equator passes a little above the spots marked 26 and 27; 26 being on the western, and 27 on the eastern side.

The following are the names given to the spots, as numbered on the wood-cut. A number preceded by * denotes a remarkable *annular mountain*, or elevated ring; by † it is indicated that there is a mountain in the centre of the ring; § denotes a remarkable cavity. The letters are attached to the names given by Riccioli to remarkable regions, and relate to ideas which were formed of the state of these regions from their general appearance, for which we need hardly say there is no foundation.

†	1	Pythagoras	§	25	Ptolemy
	2	Endymion		26	Langrenus
*	3	Plato		27	Grimaldus
	4	Aristotle		A	Sea of Fertility
	5	Hercules		B	Sea of Nectar
	6	Atlas		C	Sea of Tranquillity
	7	Heraclides Falsus	*§	D	Sea of Serenity
	8	Heraclides Verus		E	Lake of Dreams
§	9	Possidonius		F	Lake of Death
*	10	Archimedes		G	Sea of Cold
	11	Cleomedes		H	Sea of Vapours
§	12	Aristarchus		I	Bay of Tides
*	13	Eratosthenes		K	Sea of Moisture
§	14	Copernicus		M	Sea of Storms
	15	Kepler		N	Sea of Showers
	16	Hevelius		O	Bay of Rainbows
	17	Schickardus		P	Bay of Dews
*†§	18	Tycho		Q	Land of Hoar Frost
	19	Pitatus		R	Land of Drought
	20	Petavius		S	Lake of Fogs
	21	Fracastorius		T	Land of Hail
§	22	Bullialdus		V	Apennine Mountains
*†	23	Gassendus		W	Mont Blanc
†	24	Arzachel			

The astronomical phenomena exhibited to the inhabitants of the moon, if such there be, are of a character very different from those of our satellite with regard to us. As nearly the same face is always presented to the earth, it follows, that nearly one half of the moon never sees the earth. Of course the inhabitants of that half are too wise to believe travellers who come from the other hemisphere, and tell them of a large variegated ball always suspended over the heads of some, always on the right or left hand of others: and if they have as little mental light on the dark side of the moon as we had in Europe two hundred and fifty years ago, there is a vigorous inquisition armed with power sufficient to catch all believers in the earth, and make them recant. On the light side of the moon, there are of course Penny Magazines, which describe the astronomical appearances seen by spectators on the earth, speculate upon its quick rotation, nearly thirty days to one of the moon, and wonder whether the inhabitants are themselves aware of, or incommoded by, the rapid rate at which they turn, and whether they swim in the vapours which surround

their planet, or live upon them. The earth, when full, appears to an inhabitant of the moon thirteen times as large as the moon appears to us; that is, its diameter is about 3$\frac{6}{10}$ times as large as our apparent lunar diameter. It is always on the same part of the heaven, when seen from the same part of the moon. At and about the spot marked I, the earth will be directly overhead: near the edges it will appear upon the horizon. The libration will cause a small oscillatory motion to and fro of the earth: not very perceptible at those parts which have the earth distant from their horizon, but which will, at some spots near the edge, make the earth alternately sink below and rise above the horizon. In consequence of the moon having no atmosphere, or but a very thin one, all celestial objects must be seen with very great distinctness.

M. Quetelet, in his *Astronomie Elémentaire*, Paris, 1826, a very good work, which ought to be translated, has the following remarks on the appearance of the earth at the moon, which we would rather quote than vouch for, though they may possibly be well founded.

"Our vast continents, our seas, even our forests are visible to them: they perceive the enormous piles of ice collected at the poles, and the girdle of vegetation which extends on both sides of the equator; as well as the clouds which float over our heads, and sometimes hide us from them. The burning of a town or forest could not escape them, and if they had good optical instruments, they could even see the building of a new town, or the sailing of a fleet."

The lunar day, as we shall afterward see, is equivalent to our actual month of 29½ days: though the rotation of the moon on her axis is performed in the sidereal month of 27 days 8 hours nearly. Hence the inhabitant of the moon sees the sun for 14¾ of our days together, which time is followed by a night of the same duration. Of course the existence of any animal like man is impossible there, as well on this account as on that of the want of an atmosphere.

The phases which the earth presents to the moon are similar in appearance to those which the moon presents to the earth, but in a different order. Thus, when it is new moon at the earth, it is full earth at the moon: and the contrary. When the moon is in her first quarter, the earth is in its third quarter, and so on: while half-moon at the earth is accompanied by half-earth at the moon.

ON EMIGRATION TO GREECE.

[From a Correspondent.]

"Know'st thou the land where the citron blows,
Where midst its dark foliage the gold orange glows?
Thither, thither, let us go."—Goethe.

At the present moment, while emigration is taking place to a considerable extent, not only among the poorer classes, but even among persons who are not destitute of capital, it may perhaps not be unimportant to direct attention to a new field of enterprise, which upon examination may be found to present many advantages, without requiring from those who embark in it so great a sacrifice of home comforts and the other enjoyments of life as is necessary in the case of emigration to those countries which are now usually resorted to.

The country alluded to is by name familiar to all, and the attention of Europe has for some years past been directed to the interesting spectacle it has presented. Greece once more takes her rank among nations advancing in civilization; and those who are acquainted with the still unsubdued spirit, and with the many valuable qualities discernible amid numerous faults in the character of the great mass of its inhabitants, have the most sanguine hopes of seeing them exhibit the rare example of a great people, after a fall from the highest distinction to almost perfect obscurity, casting off the shackles of tyranny, and re-entering upon the path to their former eminence. The educated classes may also be expected to assist in promoting an object, which would materially tend to the improvement and instruction of a people to whose ancestors the civilized world is so greatly indebted.

A short sketch of the present condition of Greece, as far as it relates to the subject under consideration, will best tend to the promotion of the object in view. The writer being but just returned from a sojourn of some months in that country, is able to communicate information partly derived from his own observation, and partly from the statements of his Greek acquaintance. As his attention has been particularly directed to the agriculture of the country, he will first endeavour to make the existing state of that branch of industry, and all that at present influences it, sufficiently clear.

Notwithstanding its mountainous character, Greece, shortly before the breaking out of the revolution, produced more than sufficient corn for home consumption; indeed several shiploads were annually exported to Trieste, Venice, Ancona, and other ports of Italy. The soil of its plains and valleys is for the most part so fruitful, and the climate so favourable, that an abundant harvest can generally be depended upon. This flourishing state of things does not, however, any longer continue. On the spot where formerly stood the cheerful village, gaily peeping forth from surrounding groups of olives, nothing now meets the eye but a blackened heap of ruins, or at most a few solitary huts constructed hastily with mud. Where the garden once exhibited its orange and lemon shrubs, and the loaded fig-tree,—where the vineyard exposed its clusters of grapes to the maturing sun,—where the corn, the maize, and the cotton plant grew and flourished, all is now bleak and barren—all one desolate waste overgrown with thorns and thistles. The labourers who once inhabited this peaceful spot have perished or languish in slavery. Here is then a call for new labourers to restore the former prosperity. The diminished population of the country is by no means adequate to satisfy the demand. According to a recent (and it is the highest) computation, there are not more than nine hundred thousand inhabitants in the new kingdom, whereas before the revolution there existed from two to three millions; and even that is a small number compared to the population in ancient times. Nor is it the labourer alone that is required—knowledge and skill are also wanted. Even before the war the Greeks possessed but a very limited acquaintance with the art of culture; and if the produce of the land was so abundant with their careless mode of tillage, what may not be expected from the same soil, when we see applied to it the results of our more advanced agricultural knowledge and experience, combined with the use of machinery of which the Greek peasant knows not the existence. Their method of cultivation and the implements they use may be described in a few words. The plough is still as simple as in the earliest days of Greece—a small light instrument without wheels, drawn by a yoke of oxen, and penetrating but three or four inches below the surface of the soil. After being once ploughed the field is considered sufficiently prepared, and is immediately sown by hand. The use of the harrow is not known, on which account a large portion of the scattered seed falls a prey to birds, especially to a species of wood-pigeon which is common in the country. When ripe, the corn is cut with scythes, and the sheaves are carried immediately to a thrashing-floor in the middle of the field, to be trodden upon by horses and asses, which are driven round among them till the grain is separated from the ears. The same practice prevails in Italy, as represented in the wood-cut in the following page. The straw supplies the place of hay, of which there is none, as fodder for the horses and cattle, and the grain is buried in holes in the ground, where it is well preserved.



[Horses treading out Corn.]

One of the most favourable spots for a first experiment would, it is thought, be the island of Eubœa, particularly the northern division. This country, in an agricultural point of view, possesses in many respects a greater degree of similarity to England than most other parts of Greece. There is an extensive cultivation of corn and maize;—indeed, Eubœa, as is well known, was in ancient times considered the granary of Attica; and it is not so deficient as many other parts in water, without which, during the warm summer of that climate, our farmer would find many of his improvements impracticable. Another chief reason of preference is the more settled state of the island; order has never been so entirely subverted there as in the Peloponnesus and other parts of the continent, where disputes, besides, are likely to be frequent before the rightful owner of the land can establish his claim. Eubœa suffered but little from the actual presence of war and from those commotions connected with a sudden change of masters; for after a short and ineffectual struggle to regain his liberty the peasant returned to his home and former occupations, and resigned once more to the Turkish yoke. Thus the proprietors never having lost possession of their estates, the Greek or stranger who by purchase has since become a holder of land is not liable to have his right disputed, and is consequently more ready to receive the new settler and afford him a secure asylum. This is an important consideration. At the same time let it not be supposed that, because there has latterly been less disturbance and change in this country, there is less opening for emigrants, or a less urgent call for good workmen. The appearance of the island is scarcely more cheering than that of the other parts of the continent which have been described as the seat of war. The inhabitants have groaned under a long-continued system of oppression, beneath the weight of which their numbers have gradually diminished. The conduct of their Turkish masters was such as to discourage every advance and improvement. An appearance of wealth and prosperity was sure to draw down a proportionate direct or indirect increase of taxation. If, for instance, the peasant employed the profits of his labour to erect a more commodious dwelling, or to purchase articles of comfort for himself or his family, the consequence was that his master on his next visit to the village with a numerous suite of attendants, or any Turk of rank travelling through the country, would single out this abode from the surrounding ones as his resting place. Here he would perhaps remain many days, or even weeks, and during this time it would be the duty of his humble vassal to furnish him, his attendants, and horses with every necessary of life without receiving the least remuneration. The writer observed that the entrance to the little huts in many villages is built so exceedingl low, that light and a free circulation of air are in a gre measure impeded by it. This he has been assured b the people was purposely done in order that the Turk who might chance to stop in the village might not b able to bring their horses into the cottages. Their drea of these visits is still extreme. While travelling with few friends through the country the writer has ofte been amused by the panic occasioned in a village b the approach of himself and his party. Doors and win dows were closed and barred, and on their entranc they found the village apparently deserted. On on occasion, when the travellers directed their course to th house of the priest, the poor man being at some distanc from his dwelling, and not having time to fortify himsel fairly took to his heels, and concealed himself in the wood Oppression, such as they have endured, has made thes people at once cunning and listless. To deceive an defraud a *Turk* of his just share of harvest was no considered a crime, cunning being the only weapon le the poor cultivator to use. His hopelessness of improv ing his condition, combined with his ignorance, induce an apathy which appeared or really became stupidity Such were no doubt the original causes of a characte which has since been almost engrafted into his nature Still there are germs of Greek spirit beneath. A desir of information, a wish to distinguish himself, are quali ties which, it is to be hoped, will lead him to imitate better example, when the effort is no longer attende with injury to himself. It is in this respect especiall that the introduction into the country of well-dispose foreigners, although at first it may be regarded wit jealousy, will eventually be of material benefit.

[To be concluded in No. 79.]

MILTON'S SONNET ON HIS BLINDNESS.

When I consider how my light is spent
Ere half my days, in this dark world and wide,
And that one talent which is death to hide,
Lodged with me useless, though my soul more bent
To serve therewith my Maker, and present
My true account, lest he, returning, chide:
"Doth God exact day-labour, light denied?"
I fondly ask: but Patience, to prevent
That murmur, soon replies, "God doth not need
Either man's work, or his own gifts; who best
Bear his mild yoke, they serve him best: his state
Is kingly; thousands at his bidding speed,
And pass o'er land and ocean without rest;
They also serve, who only stand and wait."

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MELROSE ABBEY.



[South-east View of Melrose Abbey.]

This beautiful ruin stands in one of the vales of the Tweed, in the county of Roxburgh, having that river flowing on the north of it, and the Eildon hills looking down upon it from the south. The first abbey of Melrose stood about two miles east from the present, on the same bank of the Tweed, in a peninsula formed by a turn of the river, and terminating in a rocky precipice of some elevation. Hence the name Mail-ross, which in Celtic signifies a naked promontory, or tongue of land. The spot is still occupied by a hamlet called Old Melrose, to distinguish it from the larger village which surrounds the present abbey. This first house was a foundation of great antiquity, having been erected soon after the commencement of the seventh century. It was tenanted by an association of the Culdees, the primitive Christian clergy of Scotland, and is stated by Bede to have become an establishment of great celebrity so early as the year 664. It was here that the famous St. Cuthbert commenced his monastic life, and acquired the reputation which in his old age occasioned his transference to the greater monastery of Lindisfarne. The first monastery of Melrose, however, like all the religious buildings of those times, was probably a very humble edifice, and is said indeed to have been built only of wood. Parts of the foundation of a wall by which it had been surrounded are still to be seen; but no trace is to be discovered of the house itself.

The present abbey was founded in 1136, by King David I., commonly called St. David—" a sore saint for the crown," as he was characterized by his descendant James VI., in allusion to the curtailment of the royal patrimony occasioned by his pious liberality. The new monastery was peopled as soon as finished by an importation of Cistertians from the hive of Rival (or Rivaulx) in Yorkshire—the first of that order of monks which had been seen in Scotland, whence Melrose retained ever after the dignity of the Mother Cistertian Church of that country. It was dedicated to the Virgin in 1146.

The history of this abbey during the four centuries it existed presents very few incidents to distinguish it from that of similar establishments. There is a valuable document, known as the 'Chronicle of Melrose,' being a chronological account of Scottish affairs from 735 to 1270, compiled by the monks, which Thomas Gale has published in the first volume of his *Rerum Anglicarum Scriptores*. From the successive donations of its royal and other benefactors it rapidly rose to great wealth, and that notwithstanding the spoliation which it repeatedly

sustained from incursions of the English, when the two countries were at war. In 1561, immediately before the dissolution, its revenues amounted to £1758 in money, besides large quantities of wheat, bere, meal, oats, poultry, butter, salt, &c. The number of the monks in later times seems to have varied from about eighty to about one hundred.

After the Reformation the monastery and its estates were granted by Queen Mary to the infamous James Hepburn, Earl of Bothwell, whom she afterwards married. On his forfeiture they were bestowed upon James Douglas, a brother of the Earl of Morton; and they subsequently passed through various possessors, till they were purchased, in the course of the last century, by the family of Buccleugh, to whom they now belong. Douglas pulled down a part of the abbey, and with the materials erected a mansion in the vicinity, which is still standing. It is probable, however, that the building suffered considerably before this in the tumults by which the reformation in Scotland was attended. It is said to have received much additional injury from a popular attack upon it, as a monument of popery and episcopacy, in 1649. On this occasion many of the statues, or *images*, as they would be called, with which it was adorned, were broken to pieces; and indeed the tradition is, that the work of demolition was put an end to by a fright which the mob received from an accident which befel one of them, while levelling a blow at a figure of the Virgin. It appears at any rate that many of the statues which are now gone were in existence long after this time, as may be seen by an engraving of the abbey given in the first edition of Slezer's Theatrum Scotiæ, published in 1693.

The church had been in the form of a cross, and the ruins which still remain consist principally of the southern transept, a portion of the square tower which rose over the centre of the building, and the portion of the body of the church, including the choir and part of the nave, to the east of the tower. The roof has nearly all fallen in. Still, even in this state of decay and desolation, the pile remains a monument of architectural taste and skill of almost unrivalled beauty. "Mailross," writes the eminent antiquary Francis Drake, in a letter to Roger Gale, dated 14th July, 1742, "I shall take upon me to say, has been the most exquisite structure of its kind in either kingdom." Mr. Hutchinson, in his View of Northumberland (2 vols. 4to. 1778), from whose account of Melrose the notices that have since appeared have been chiefly borrowed, expresses himself in terms of equally fervent admiration. Speaking of the ornamental work on the door which had led from the northern transept to the cloister, he says, "The fillet of foliage and flowers is of the highest finishing that can be conceived to be executed in freestone, the same being pierced, the flowers and leaves separated from the stone behind, and suspended in a twisted garland. In the mouldings, pinnacle work, and foliage, of the seats which remain of the cloister, I am bold to say there is as great excellence to be found as in any stone work in Europe, for lightness, ease, and disposition. Nature is studied through the whole, and the flowers and plants are represented as accurately as under the pencil. In this fabric there are the finest lessons, and the greatest variety of Gothic ornaments, that the island affords, take all the religious structures together."

The chisel of the sculptor who thus ornamented Melrose has been singularly fortunate in the material upon which it was exercised. "The stone," says Scott, "though it has resisted the weather for so many ages, retains perfect sharpness, so that even the most minute ornaments seem as entire as when newly wrought. In some of the cloisters there are representations of flowers, vegetables, &c. carved in stone, with accuracy and precision so delicate, that we almost distrust our senses, when we consider the difficulty of subjecting so hard a substance to such intricate and exquisite modulation." In the poem to which this note is appended, the Lay of the last Minstrel, the following lines also occur, descriptive of the beauty of these representations and their nice fidelity to nature:—

"Spreading herbs and flowerets bright
Glistened with the dew of night;
Nor herb nor floweret glistened there,
But was carved in the cloister arches as fair.

* * * * *

By a steel-clenched postern door
They entered now the chancel tall,
The darkened roof rose high aloof
On pillars, lofty, and light, and small;
The key-stone that locked each ribbed aisle,
Was a fleur-de-lys, or a quatre-feuille;
The corbells were carved grotesque and grim;
And the pillars with clustered shafts so trim,
With base and with capital flourished around,
Seemed bundles of lances which garlands had bound.'

The most superb parts of the ruin are the entry to the southern transept with the window over it, and the great eastern window, both of which are represented in our engraving. Scott thus describes the latter as seen from the interior, by his hero William of Deloraine, and his guide "the Monk of St. Mary's aisle:"—

"The moon on the east oriel shone,
Through slender shafts of shapely stone,
By foliaged tracery combined;
Thou would'st have thought some fairy's hand,
'Twixt poplars straight the osier wand,
In many a freakish knot, had twined;
Then framed a spell, when the work was done,
And changed the willow-wreaths to stone.
The silver light, so pale and faint,
Showed many a prophet, and many a saint,
Whose image on the glass was dyed;
Full in the midst his cross of red
Triumphant Michael brandished,
And trampled the Apostate's pride.
The moonbeam kissed the holy pane,
And threw on the pavement a bloody stain."

According to Hutchinson the entire length of the abbey is 258 feet, and that of the transept 137. What remains of the tower is 75 feet in height, but it appears to have been anciently surmounted by a spire. The character of the architecture proves that very little of the building erected by David I. now remains. The monastery is known to have undergone an extensive restoration during the reign of Robert Bruce in the early part of the fourteenth century; and what we now see is probably the work of that age.

There is no other remnant of antiquity in Scotland which has of late years been so much visited by strangers as Melrose. Since the publication of the Lay of the last Minstrel especially, the fame of the place has been carried wherever our language is known. This general admiration has occasioned a good deal to be done for the preservation of the ruin. Formerly a part of the nave was used as the parish church, and the erections rendered necessary by this appropriation sadly injured the effect of the ancient architecture. A new parish church has lately been built, and the abbey is left to the solitude and silence best becoming its dismantled state, and that of the fallen faith of which it is the monument. The beautiful ruin may now be contemplated without the pensive remembrances which it recalls being broken in upon by any foreign and incongruous associations, as the well-known lines of Scott have described it:—

"If thou would'st view fair Melrose aright,
Go visit it by the pale moonlight;
For the gay beams of lightsome day
Gild, but to flout, the ruins gray.
When the broken arches are black in night,
And each shafted oriel glimmers white;
When the cold light's uncertain shower
Streams on the ruined central tower;
When buttress and buttress, alternately,
Seem framed of ebon and ivory;
When silver edges the imagery,
And the scrolls that teach thee to live and die;

When distant Tweed is heard to rave,
And the owlet to hoot o'er the dead man's grave;
Then go,—but go alone the while—
Then view St. David's ruined pile;
And, home returning, soothly swear,
Was never scene so sad and fair!"

CONFLAGRATIONS OF FORESTS IN SWEDEN.

We extract the following animated passage from Sir Arthur de Capell Brooke's very interesting Travels through Sweden, Norway, and Finmark, to the North Cape:—

"We passed by some extensive tracts of forests consumed by fire, the appearance of which was desolating in the extreme. The beautiful covering of lively green, on which the eye had rested with such pleasure, had disappeared; while around lay scattered in all directions blackened trunks of the withered pines, like fragments of charcoal. Various causes may be said to combine in producing these northern conflagrations; it is not surprising, therefore, that they should so often occur. It is a general practice with the peasants, when they wish to clear a portion of forest that may have been allotted them, to effect it by burning. This not only saves them the infinite labour of removing the thick underwood, and facilitates the progress of the axe, but is of very beneficial consequence to the land, as the ashes form a highly fertilizing manure. It frequently happens, however, from not using proper precautions, or from beginning the operation of burning when the dry season is too far advanced, that they are unable to confine the fire within the intended limits; and it soon spreads itself over a wide tract of country, carrying with it destruction and ruin. Sometimes these extensive conflagrations arise from motives of malice or revenge: and an instance was related to me of a peasant, who applied for a portion of forest to clear and cultivate, which is generally granted; but finding his request refused, irritated by the disappointment, he set it on fire. The whole country, for many miles around, was involved in flames; and a considerable length of time elapsed before it could be stopped. Lightning not unfrequently causes these extensive devastations, falling upon the dry branches of a decayed pine, which it sets on fire, and this communicates quickly to the parched moss beneath. A peasant, after smoking, knocks out the ashes of his pipe; for some hours they lie smothering and concealed; by and by the rising breeze fans them into life and flame, and the work of destruction is begun. Running through the moss, as dry and inflammable as tinder, the flame meets with a pine, and quick as lightning ascends it, assisted by the resinous juices of the tree. In this manner it spreads rapidly through the whole forest, which, crackling amid flame and smoke, presents a spectacle terrific and imposing. The distant traveller, ignorant of the cause, sees with astonishment the singular red appearance of the horizon; and should he unfortunately have to pass through the burning forest, he will find it very difficult to avoid its fury. Surrounded on all sides by falling trees, his path concealed by smoke and flame, he stands bewildered, uncertain whether to advance or retreat. If a breeze arise, the whole forest glows; a thousand loud explosions are heard around; and should the gently refreshing shower descend, a loud hissing is heard, a dense smoke creeps along, and the smothering flames are for the moment repressed, only to burst out afresh with greater fury. The tenants of the forest, driven from their wild haunts, hitherto undisturbed, flee before their irresistible enemy into parts before secure from their attacks; and bears and wolves, forced from their accustomed retreats toward the habitations of man, make desperate attacks upon the cattle of the peasants. Few spectacles can be conceived more fearfully sublime than a conflagration of this kind in uninhabited parts of the North, to one who witnesses from the mountain top the progress of the flames, and the alteration so quickly made on the smiling face of nature, at the approach of the destroying element."—p. 41, &c.

Farther north than the country referred to by our English traveller, i. e. in Lulea Lapland, the great Swedish naturalist, Linnæus, of whom we gave some account in No. 72 of our Magazine, had a narrow escape for his life from one of these forests set on fire by lightning. This happened in a season of remarkable drought. "I traversed," says he, "a space three quarters of a mile in extent (about four miles and a half English), which was entirely burnt; so that Flora, instead of appearing in her gay and verdant attire, was in deep sable; a spectacle more abhorrent to my feelings than to see her clad in the white livery of winter; for this, though it destroys the herbage, leaves the roots in safety, which the fire does not. The fire seemed nearly extinguished in most of the spots we visited, except in ant-hills and dry trunks of trees. After we had travelled about half a quarter of a mile (Swedish), across one of these scenes of desolation, the wind began to blow with rather more force than it had previously done; upon which a sudden noise arose in the half-burnt forest, *such as I can only compare to what may be imagined among a large army attacked by an enemy.* We knew not whither to turn our steps; the smoke would not suffer us to remain where we were, and we durst not turn back. It seemed best to hasten forward in hopes of speedily reaching the outskirts of the wood, but in this we were disappointed. We ran as fast as we could, in order to avoid being crushed by the falling trees, some of which threatened us every minute. Sometimes the fall of a large trunk was so sudden, that we stood aghast, not knowing which way to turn to escape destruction, and throwing ourselves entirely on the protection of Providence. *In one instance a large tree fell exactly between me and my guide, who walked not more than a fathom from me; but, thanks to God! we both escaped in safety.* We were not a little rejoiced when this perilous adventure terminated, for we had felt all the while like a couple of outlaws in momentary fear of surprise."—*Lacchesis Lapponica.*

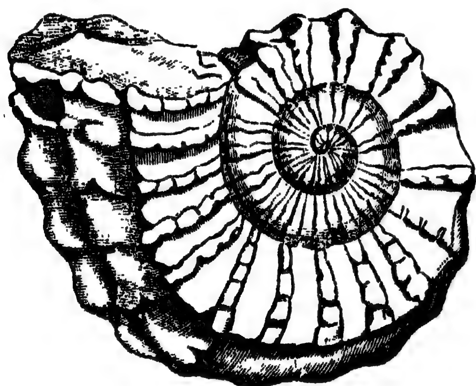
Bear-Hunting in Sweden and Norway.—At Haga (near the frontiers of Norway), we first heard great complaints of the bears in the neighbouring forests, and of the ravages they had made among the cattle. A fortnight before, three had been killed by the peasantry, which they described as being as large as the small horses that drew our vehicle, and of the black species. For the purpose of destroying them, the peasants assemble in large numbers, and extending themselves in a line, beat through the part of the forest where they are supposed to be, uttering at the same time loud shouts, and firing occasionally their guns. The bears being thus disturbed assemble together, sometimes to the number of twenty, and the hunters then collecting their forces surround them and commence a general fire upon the foe. This kind of hunting is attended to those who pursue it singly with considerable danger; as if the first shot miss, or any other part than the head be wounded, the enraged animal rushes upon the aggressor, whose only dependence must then be upon his own speed, though by retreating quickly behind a tree, if he have sufficient agility, he may have a chance of escaping. In Norway, however, as well as in the northern parts of Sweden, the peasant undaunted goes thus in pursuit of the bear unattended, relying upon his own skill and activity, and generally returns triumphant. Sometimes he takes along with him two or three small dogs, which when the bear is found by barking around him, divert his attention from the hunter who is thus enabled to get a certain shot. In this manner a peasant in the neighbourhood of Kongsvinger in Norway, who was celebrated for his address in this kind of hunting, had in a very short time destroyed six of these animals. An instance of singular courage took place the preceding winter at Haga, in a peasant who searching for his cow found a large bear making a repast on her. Unterrified, though armed only with his hatchet, he without hesitation attacked it, and had the good fortune to come off victorious without sustaining any injury.—*Sir Arthur de Capell Brooke's Travels in Sweden, &c.*

MINERAL KINGDOM.—Section 10.

ORGANIC REMAINS.

It will be in the recollection of our readers, that in giving these geological sketches we set out with no other intention than that of laying before them a condensed view of the great leading facts connected with the structure of the earth's crust, as an introduction necessary to the right understanding of the articles we propose to insert from time to time, on the great mineral productions which belong to the business of common life. The introductory matter has grown under our hand beyond what we at first contemplated it would extend to, but we should leave it too imperfect unless we said somewhat more on the subject of organic remains. We shall, however, limit ourselves to a few important facts connected with the great classes of fossil organized bodies.

We have said that shells are by far the most numerous class of fossils: they are found in all formations, from the lowest stratum in which animal remains have been seen, to the most recent deposit now in progress. To a person who has made conchology (or the science of shells) a special object of study, there are many striking differences between those found in a fossil state and such as now exist in our seas, lakes, and rivers; but were we to describe or give representations of even remarkable fossil shells, a general reader would discover in most of them nothing so peculiar as to arrest his attention. There is, however, one which is so different from any thing now living, and of such common occurrence in a fossil state, that we are induced to give it as a good example of an extinct genus. It is called the Ammonite, formerly the *Cornu Ammonis*, that is, the horn of Ammon, from its resemblance to those horns which are affixed to the head of the statues of Jupiter Ammon.



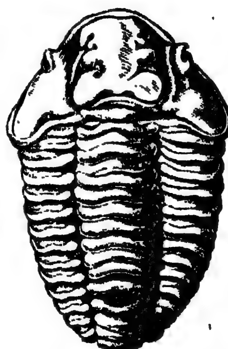
(Fig. A.)

Fig. A is a representation of the exterior of one of the numerous species of which this genus is composed. These shells are found of all sizes, from that of a few lines to nearly four feet in diameter, and above three hundred different species are said to have been observed. When the shell is slit, it exhibits the appearance represented by the following fig. B, for it is usually filled with stony matter, and often with transparent sparry crystals. It consists of a series of small chambers or cells arranged in a form like a coiled snake, the different cells having apparently a communication with each other by a small tube or canal which runs near the outward margin of the coil. It is supposed that the animal first inhabited the innermost cell, that as it grew it formed larger and larger cells for itself, keeping up the communication with the former one. It is conceived, too, that the animal had the power of filling or emptying these cells, so as to regulate its motion in the water, filling them when it wanted to occupy the depths of the sea, and emptying them when it wished to make itself lighter in order to rise to the surface. The living shell to which it has the nearest resemblance is the nautilus. This remarkable fossil is found in all the stratified rocks from the Mountain Limestone (see Diagram, Sec. 2, p. 91, O.) to the uppermost of the secondary strata. It thus continued to be reproduced through many succeeding ages, long after other genera, its first cotemporaries, had become extinct; but it also in its turn ceased to exist, at the period when the tertiary strata began to be formed. The shell is so extremely thin, and so brittle, that it is rare to find perfect specimens, unless when preserved by being incased in hard stone.

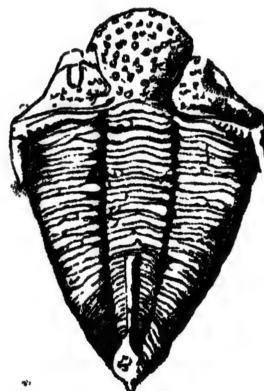


(Fig. B.)

There are some *genera* of shells in the lowest strata containing animal remains, which are also found inhabiting our present seas; but there is not a single *species* of any of the genera of shells found in the whole range of the *secondary* strata that is identical with a living species; all are extinct. In the oldest of the tertiary beds, some shells are found identical with living species, and the proportion of these increases the more recent the deposit, until at last they greatly predominate over the extinct species in the more recent deposits. It is thus evident that there has been an extinction of some genera and species, and a creation of others, in a constant state of progression, from the earliest periods of the earth's history. In the case of fossil shells, as well as other organic remains, a great proportion bear a strong analogy to such as are now only known to inhabit tropical seas.



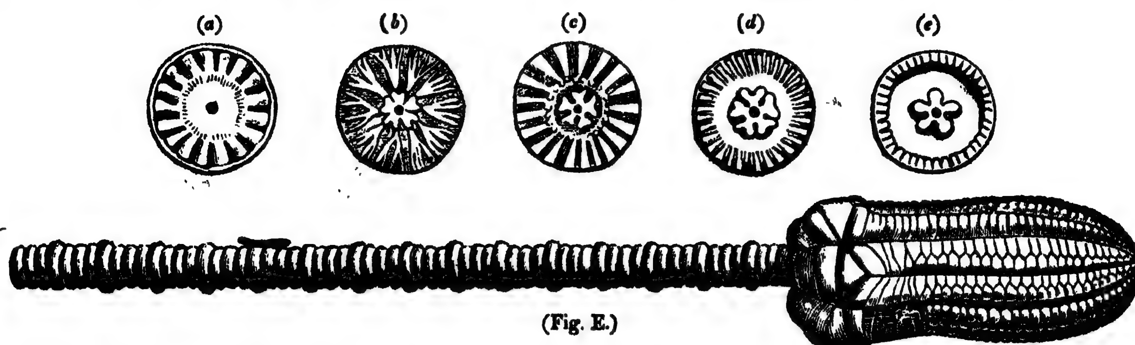
(Fig. C.)



(Fig. D.)

Figures C and D are specimens of two species of a crustaceous marine animal, which has been wholly extinct from an early period in the formation of the crust of the globe; myriads of ages may have elapsed since it ceased to exist. It has not been found in any rock lying above the Mountain Limestone, and that rock is so low in the series of the strata that the earth must have undergone many successive revolutions, each separated by an interval of vast duration, since the time

when these animals were inhabitants of the sea. There are several species of the animal, which has been called Trilobite, from the body being composed of three longitudinal divisions or lobes. It was first brought under the notice of naturalists by the name of the Dudley Fossil, being found very frequently in the limestone near the town of that name in Worcestershire, not far from Birmingham; but it is also found in other parts of England, in Germany, and Sweden, and specimens have been brought from North America. It is met with in some spots in such immense quantities that it must have had prodigious powers of multiplication. In some parts of Wales the slate is so full of fragments of the animal that millions must have swarmed on the spot.



(Fig. E.)

Another fossil animal which is very peculiar in its form is that represented in fig. E, called the Lily Encrinite. It resembles that flower upon its stalk, and still more so when the several parts of which the flower-like extremity is composed, are separated and spread out; specimens of it in this state are not unfrequently met with. The animal lived in the base of the flower, and the separable parts stretched out like arms to seize its prey. It was fixed to the ground by the other extremity of the stalk. That stalk is not a single piece, but consists of a number of distinct joints like those of the back-bone, or like a necklace of beads, on which account the fossil has been sometimes called *Encrinites Moniliformis*, or Necklace-form Encrinite. The stalk is perforated through its whole length, and the joints when separated have figured surfaces, such as are represented above in the circular bodies *a, b, c, d, e*, the figure being different at different parts of the stalk. This *family* of radiated animals, which consists of many extinct genera and species, has not wholly disappeared like the trilobite and ammonite; living representatives of it are still found in the seas of the West Indies, and a very perfect specimen may be seen in the Museum of the Geological Society: but the lily encrinite, that branch of the family, is not only wholly extinct, but has been so ever since the period when the New Red Sandstone was deposited. It appears to have had comparatively a short existence, for it has only been found in a limestone which occurs associated with the New Red Sandstone. It is met with abundantly in that particular limestone which occupies a great extent of country in Germany, but the fossil has never been seen in England, and that kind of limestone is not found in our island.

The remains of fishes occur in almost every stratum, from the Old Red Sandstone up to the most recent deposits of fresh-water lakes. Fossil fish have been less accurately made out, as to the genera to which they belong, than any other kind of animal remains, because the natural history of fishes is not so far advanced as that of most other departments of zoology. The great French naturalist Cuvier began an extensive work on the subject, and had he lived much would have been done, for his master-genius threw light on every thing he touched. One of the most celebrated places for fossil fish is a hill near Verona in Italy, called Monte Bolca; immense quantities have been found there in a very perfect state of preservation, as far as the form is concerned, but, as in most other cases, quite flattened and thin, so that they are like a painting or engraving of a fish. These impressions are of rare occurrence in comparison with the quantity of separate bones that are found in most strata: teeth of the shark are frequently met with, and sometimes of a size which must have belonged to individuals of giant dimensions, such as are not now seen in any seas.

By far the most remarkable fossil remains of extinct marine animals are certain species which resemble the crocodile and alligator, and often of a magnitude which these never reach; but we must defer to another section what we have to say respecting these extraordinary creatures, which were inhabitants of our planet at a period of its history when the climate of the sea that covered the deposits now forming the cliffs of Lyme Regis, in Dorsetshire, was as hot as the West Indies.

THE ANGLO-CHINESE KALENDAR FOR THE YEAR OF THE CHRISTIAN ERA 1833.

We have before us a copy of a publication, with the above title, bearing to be printed in China, at the Albion press, and to be on sale "at Markwick and Lane's, Canton and Macao;" "where also," it is added, "may be obtained, A Companion to the Anglo-Chinese Kalendar for 1832; containing various commercial and other tables, many of which continue applicable to the present time." The price of the Companion is one Spanish dollar, that of the Kalendar half as much, or 50 cents. We regard this production as a very great curiosity, and as one of the most interesting signs of the times. The printing press may be said to take a decided part in the regulation of human affairs, when it begins to throw off newspapers and almanacs. Up to this point literature is the luxury of a few; thenceforth it becomes a necessary of life to all, and exercises the power appertaining to that character. The present is, over all the globe, the age of this its new and more mighty manifestation. It is some years since a newspaper, printed partly in the native tongue of the tribe, was established among the Cherokees of North America. There is more than one newspaper now published in the popular dialect of India. Even the Turks now have their printed newspaper. And here we have an Almanac and Companion printed in China, where, we believe, an English newspaper has also been, for some time published. This country, indeed, is the native land of the art of printing, which was practised here many centuries before it was known in Europe; but yet, all circumstances considered, the appearance of an English Almanac from the press of Canton is perhaps more remarkable than any of the other novelties we have mentioned.

The Anglo-Chinese Kalendar commences by some introductory remarks on the Chinese year, which is luni-solar, that is to say, is regulated by the motions of the moon, but is accommodated also, in a rude and imperfect

way, to that of the sun, by the insertion, or intercalation, as it is called, of an occasional thirteenth month, when requisite. The year 1833 of our reckoning corresponds to the Chinese year *Kwei-sze*, or the thirtieth of the 75th cycle of sixty, which commenced on the 20th of February, and is the thirteenth of the reigning Emperor Taoukwang. The Chinese week consists, like our own, of seven days, one of which is kept as a holiday or sabbath.

The present Kalendar is drawn up according to the European form, and contains, besides notices of anniversaries, a list of festivals and remarkable days, comprehending most of those observed either in China or Christendom. Some notes are appended, explanatory of the Chinese festivals, from which we shall give one or two extracts. The following is the note on the festival of Spring, or the Leih-chun term-day, being the 15th day of the 12th moon, which this year fell on the 4th of February: "This day, the period of the sun's reaching the 15th degree in Aquarius, is one of the chief days of the Chinese Kalendar, and is celebrated with great pomp, as well by the government as by the people. In every capital city there are made, at this period, two clay images, of a man and a buffalo. The day previous to the festival, the chefoo, or chief city-magistrate, goes out to *ying chun*, meet spring; on which occasion children are carried about on men's shoulders, each vying with his neighbour in the gorgeousness and fancifulness of the children's dresses. The following day, being the day of the festival, the chefoo again appears as priest of spring, in which capacity he is, for the day, the first man in the province. Hence the chief officers do not move from home on this day. After the chefoo has struck the buffalo with a whip two or three times, in token of commencing the labours of agriculture, the populace then stone the image till they break it in pieces. The festivities continue ten days."

The 20th of February, as already mentioned, was this year the new-year's day of the Chinese. It is called by them Yuen tan, or "the first morning." "The period of new year," says the Kalendar, "is almost the only time of universal holiday in China. Other times and seasons are regarded only by a few or by particular classes, but the new year is accompanied with a general cessation of business. The officer, the merchant, and the labourer, all equally desist from work, and zealously engage in visiting and feasting,—occasionally making offerings at the temples of those deities whose peculiar aid they wish to implore. Government offices are closed for about ten days before, and twenty days after new year; during which period none but very important business is transacted. On the last evening of the old year, all tradesmen's bills and small debts are paid. This is perhaps the reason why it is called *choo seih*, the evening of dismissal."

We may add the account of the festival of dragon boats, called in Chinese, Twan-woo or Twang-yang, and also Teen-chung, falling this year on the 22d of June. "On this day many people race backwards and forwards, in long narrow boats, which being variously painted and ornamented so as to resemble dragons, are called *lung chuen*, 'dragon boats.' From the narrowness of the boats, and the number of persons on board, there being sometimes from sixty to eighty oars, or rather paddles, it frequently happens that several of the boats break in two; so that the festivities seldom conclude without loss of several lives. Tradesmen's accounts are cleared off at this period."

The Chinese, we find, have their immortal Francis Moore as well as ourselves. The 5th of July, being the eighteenth day of the fifth moon, is the birth-day of the astronomer Chang, of whom the following account is given: "This individual, who formerly superintended the making of the Chinese Kalendar, is supposed still to exist, and to predict eclipses, and other astronomical, as well as astrological phenomena."

The most interesting part of this Kalendar, however, is its account of the Chinese seasons, given in the form of notices at the head of each month. It may be presumed that, prepared as they are in the country to which they refer, the correctness of these descriptions may be depended on; and we shall therefore give the whole.

"January.—The weather, during the month of January is dry, cold, and bracing; differing but little, if at all, from the two preceding months, November and December. The wind blows generally from the north, occasionally inclining to north-east or north-west. Any change to south causes considerable variation in the temperature of the atmosphere.

February.—During this month the thermometer continues low; but the dry bracing cold of the three preceding months is changed for a damp and chilly atmosphere. The number of fine days is much diminished, and cloudy or foggy days are of more frequent recurrence in February and March than in any other months. At Macao the fog is often so dense as to render objects invisible at a very few yards distance.

March.—The weather in the month of March is also damp and foggy, but the temperature of the atmosphere becomes considerably warmer. To preserve things from damp it is requisite to continue the use of fires and closed rooms, which the heat of the atmosphere renders very unpleasant. From this month the thermometer increases in height until July and August, when the heat is at its maximum.

April.—The thick fogs which begin to disappear toward the close of March are in April seldom if ever seen. The atmosphere however continues damp, and rainy days are not unfrequent. At the same time the thermometer gradually rises, the nearer approach of the sun rendering its heat more perceptible. In this and the following summer months south-easterly winds generally prevail.

May.—In this month summer is fully set in, and the heat, particularly in Canton, is often oppressive; the more so from the closeness of the atmosphere, the winds being usually light and variable. This is the most rainy month in the year, averaging fifteen days and a half of heavy rain; cloudy days without rain are however of unfrequent occurrence; and one half of the month averages fair sunny weather.

June.—June is also a very wet month, though, on an average, the number of rainy days is less than in the other summer months. The thermometer in this month rises several degrees higher than in May, and falls but little at night. It is this circumstance, chiefly, which occasions the exhaustion often felt in this country from the heat of summer.

July.—This month is the hottest in the year, the thermometer averaging eighty-eight in the shade at noon, both at Canton and Macao. It is likewise subject to frequent heavy showers of rain; and, as is also the month of August, to storms of thunder and lightning. The winds blow almost unintermittingly from south-east or south.

August.—In this month the heat is generally as oppressive, and often more so than in July, although the thermometer usually stands lower. Towards the close of the month the summer begins to break up, the wind occasionally veering from south-east to north and north-west. Typhons seldom occur earlier than this month, or later than the end of September.

September.—In this month the monsoon is entirely broken up, and northerly winds begin to blow, but with little alleviation of heat. This is the period most exposed to the description of hurricanes called Typhons, the range of which extends southwards, over about one-half of the Chinese sea, but not far northward. They are most severe in the Gulf of Tonquin.

October.—Northerly winds prevail throughout the month of October, occasionally veering to north-east or north-west; but the temperature of the atmosphere is neither so cold nor so dry as in the following months. Neither does the northerly wind blow so constantly, a few days of southerly wind frequently intervening. The winter usually sets in with three or four days of drizzling rain.

November.—This month and the following are the pleasantest in the year, to the feelings, at least, of persons from more northern climes. Though the thermometer is not often below forty, and seldom so low as thirty, the cold of the Chinese winter is often intense. Ice sometimes forms about one-eighth of an inch thick, but this is usually in December or January.

December.—The months of December and January are remarkably free from rain; the average fall in each month being under one inch, and the average number of rainy days being only three and a half. On the whole, the climate of Canton, but more especially of Macao, may be considered very superior to that of most other places situated between the tropics."

The following Table presents a view of the range of the Thermometer at Canton:—

	Average, Noon.	Average, Night.	Highest.	Lowest.
January	64	50	74	29
February	57	49	78	38
March	72	60	82	44
April	77	68	86	55
May	78	72	88	64
June	85	79	90	74
July	88	81	94	79
August	85	78	90	75
September	83	76	88	70
October	77	69	85	57
November	67	57	80	40
December	62	52	70	45

ON EMIGRATION TO GREECE.

[Concluded from p. 240.]

According to the agreement concluded between the Porte and the three Great Powers, the Turks in Eubœa and some parts of Attica have sold or are still selling their estates. Thus many private individuals find themselves proprietors of extensive territories, of which, however, from the causes above-mentioned, vast tracts lie waste, and they consequently derive little profit from lands which, in this country, would be of immense value. They would receive those who have some acquaintance with agriculture most thankfully, and would supply them with land at a very moderate rent. This is not a mere supposition; the writer has been assured of it by many proprietors personally. Rent has been mentioned, although to receive a fixed sum for the use of a certain portion of land has not been customary. The common agreement is still the same which has been alluded to as subsisting between the Turk and his peasant, but is open to so many objections on account of the disadvantages both to landlord and tenant that it will probably soon fall into disuse. The former provides each family on his estate with a cottage, a yoke of oxen, and sufficient seed for one *Zeugari* (literally, yoke, used to designate an extent of from fifty to sixty acres in Eubœa, of one hundred and upwards in Attica and other parts); and the tenant, after collecting the harvest, from which is first deducted the seed for the next year's sowing, divides the remainder into equal parts, one for himself, and one for his landlord. If the tenant finds his own oxen and seed, he only gives one-third of the produce to the landholder. The abuses to which this arrangement is subject are too evident to require pointing out.

It remains to add a few more detailed remarks upon the climate and produce of the country.

The climate, in general, may be said to hold a middle station between the burning heat of Egypt and that of the temperate zone. The air is clear and wholesome, and the sea-breezes, which penetrate into the deep bays that characterize this land, tend greatly to banish that feeling of oppression which usually accompanies heat during the summer months in southern climes. The winter is almost invariably mild, snow being seldom seen except on the summits of the mountains. This season announces its approach during the month of November by casual showers, which become more frequent as it advances. The only period during which any degree of cold is felt is from the latter end of December to the middle of February. Towards the close of the latter month the flowers of spring cover the mountain-side, among which the rich and varied dye of the wild anemone is eminently distinguishable. The almond-tree scatters its silver blossoms to the wind, which are speedily followed by those of the whole tribe of odour-breathing fruit-trees. Still now and then dark clouds roll down from the mountains, and breaking with claps of thunder over the plain and valley, continue to supply the earth with moisture against the coming of summer. In March the peasant sows cotton, cuts his vines, and begins once more to use his plough. The storms occur more rarely, and a smiling, as yet not burning, sun, in a clear sky, calls forth a vegetation which reaches its highest luxuriance and perfection as early as the month of April; the myrtle, the laurel, and the oleander, supplying the place of our northern bushes. Towards the end of April the autumn-sown wheat and barley are in full blossom: from May to the close of October the heavens present one bright expanse of cloudless blue. The heat is great; and after the harvest nature seems to enjoy a perfect repose, the most delicious fruits serving to refresh the inhabitants during this period. In October is the vintage. The island of Eubœa, the writer has been told, is not quite so free from rain during the summer months, which must be a great relief. There are some spots injurious to health, where the air is unwholesome and causes fevers; but this probably arises from the neglect of cultivation, and from the water having been allowed to form morasses. It is to be expected, therefore, that when the causes are removed the effect will cease; yet, of course, it were better that such spots as stand in bad repute should be avoided by the settler. As far as the writer's experience, and the testimony of many who have spent several years in the country can prove, the climate, on the whole, is certainly healthy. At the same time, as it is a great change to an emigrant coming from a northern country, certain precautions are very advisable. Moderation in food and drink, particularly in fruit, and care not to expose the body to cold by a change of temperature, are two rules of especial importance.

The productions of this kingdom are very various. The cultivation of wheat and barley is general, and very successful. Oats are not so common, neither do they prosper so well, for which reason the horses are generally fed with barley. Maize is much valued, particularly as winter fodder for cattle: it grows to a great size, but requires a damp situation, or a spot which is capable of being irrigated. The cotton plant is another common production, which likewise requires much moisture. The chief riches of the country, however, consist in oil, wine, and silk. The fable of Minerva presenting the olive to the Greeks is well known, and certainly it is a gift which cannot be too highly valued, yielding a rich and never-ceasing supply (for this tree, from the immense age it attains, is said never to perish), and requiring but a very small share of labour. Honey is supplied in great abundance, and of the best quality. Rice is partially cultivated, but is inferior in quality to the Egyptian. Oranges and lemons in profusion, as well as fruits of almost every description, arrive at perfection in this genial climate. The potato is little known, but has been tried by a gentleman of the writer's acquaintance in Eubœa, who assured him it was very productive; indeed, nearly every variety of vegetable flourishes, and is plentiful.

The northern part of Eubœa is richly wooded. Among the most common trees are the pine, the oak, the plane-tree, the chesnut, and the walnut. The pine, which seems now to be of use merely on account of the rosin which is obtained by cutting deep notches into the trunk, or as fuel, will, when saw-mills are introduced, when roads are made, and the means of transporting the felled trunks to the sea are provided, become an object of great importance. The planks for the flooring

of dwelling-houses are at present brought from Trieste, which of course renders them very expensive. This pine is of a species too which can be used for ship-building; and the distance from Eubœa to the port of Syra, where the greatest part of the Grecian vessels are constructed, is very inconsiderable.

There is very little difficulty in conveying the produce of the soil to a ready market. The sea is nearly every where so accessible, and there are so many hundreds who gain a livelihood by their little vessels, employed in transporting the goods of one island or part of the country to another where they are more wanted, or to some port where they can be embarked in larger vessels for exportation, that as soon as any commodity is known to be for sale, it is soon sought for and carried away. The price of provisions is perhaps about two-thirds cheaper on an average than in England*.

* Milk is scarce—sheep's milk alone is used. Mutton 2*d.* per lb. Bread 3*d.* per loaf, weighing 2½ lbs. Wine 1½*d.* per bottle. Eggs 2*d.* or 3*d.* per dozen. Beef is scarce. Goat's flesh is cheaper, and commonly used by the people. Fruit is exceedingly cheap—grapes less than 1½*d.* per lb.

Undoubtedly such a country as that of which we have here given a faithful picture, offers advantages for emigration; still it must not be supposed that there is not here likewise much to struggle against, especially if the emigrant is entirely without means. In many respects Greece is yet a wild country, and much remains to be done. Roads there are few or none; and the dwellings that may at first be given or raised for new comers, will be found to present accommodations inferior perhaps to those even of the lowest class of cottages in England. The difference of language and of religion is also of course to be considered as among the inconveniences with which the emigrant must lay his account.

As to the opening offered to mechanics, there is no doubt that with the advance of improvement in the country many would find full employment, and be well paid, as the Greeks themselves are nearly ignorant of many branches of industry. There are but very few manufacturers of any description; therefore the emigrant would do well to take with him any articles of household use, such as cloth, linen, knives, &c. &c.



[View of the Town of Egripos in Eubœa, from the Sea.]

A Summer Evening and Night in Sweden.—Evening now closed upon us, unaccompanied however with that dusk so pleasing and grateful to the eye overpowered by the burning glare of the day. The contrast between a summer evening in Sweden and England is sufficiently striking. In the latter, the busy hum of the country gradually subsiding, the barking of the village cur mingled with the noisy gambols of the children upon the green, are borne by the gale upon the listening stranger in the sweet notes of peace and harmony, till the grey vest of night spreads around and closes the scene. In the former, the sun reluctantly quits the horizon at eleven o'clock, his lingering rays even at the hour of midnight throw a streak of crimson light across the heavens, and impart a fiery tinge to the landscape, a dead silence reigns, and creation reposes in the absence of the night. Even in the small hamlets thinly scattered through the immense forests, at a very early hour of evening no traces of inhabitants appear. The ploughman's whistle, the lowing of the herds, and the deep tone of the evening curfew, so enchantingly described by our bard (Gray, in his exquisite and well-known Elegy in a Country Church-yard), are unheard; and not a sound strikes upon the ear, except perchance the distant tone of the lure, blown by some Swedish peasant-boy to collect his wandering cows. The whispering breeze, however, creeping through the dark pine forest, sighs in melancholy accents [illegible] the Æolian lyre, and fills the mind with the softest [illegible]; while the eye, darting between the tall straight [illegible]rising in quick succession, conjures up amid the surrounding gloom the flitting forms of fancy. Thus for a short time eve's pensive hour glides silently on, undisturbed and unenjoyed by man, who wrapt in sleep thinks only of preparing himself for the toils of the coming day. At one o'clock the animal creation returns to life, and the singing of various birds announces the approach of morn. A deep blush now spreads along the heavens, and shortly afterward the fiery orb of the sun shoots aloft, and gilds the mingled landscape of mountain, lake, and forest, while the rolling mists of night slowly retreat at his presence. Thus, during the fleeting months of a northern summer, the sun in the higher latitudes keeps circling constantly round the horizon, and darkness is unknown. To this unceasing day continued night however soon succeeds; the extreme of heat is followed by that of cold; and in the absence of the meridian sun, the moon, during two of her quarters, rises high in the heavens, never setting; while the increasing brilliancy of the constellations, and the darting fires of the Aurora Borealis, rushing through the firmament, light up the skies, and compensate the inhabitants of those frozen regions for the loss of the day.—*Sir Arthur de Capell Brooke's Travels in Sweden, &c.*

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

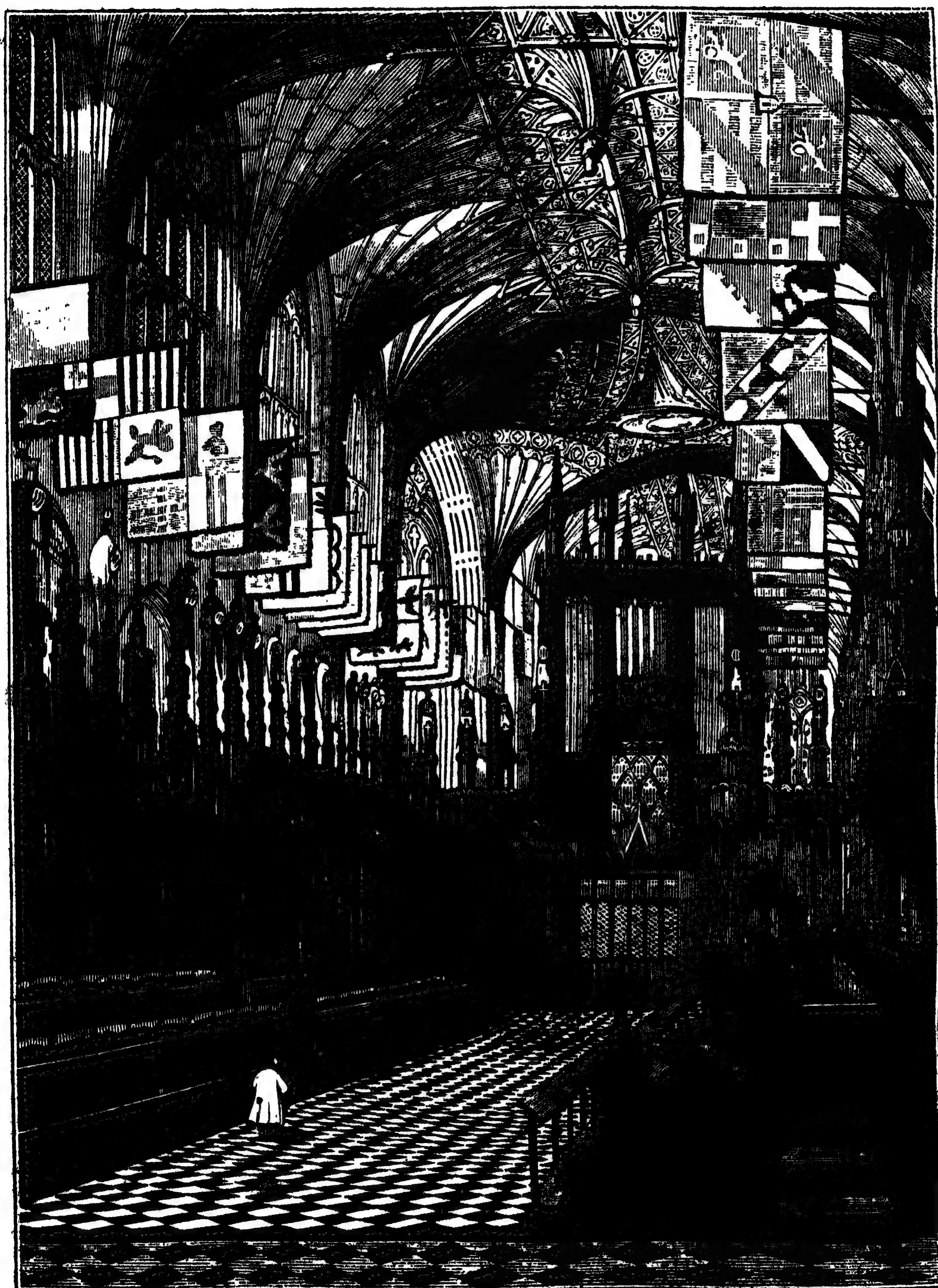
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WINDSOR CASTLE.



[1. St. George's Chapel, Windsor. Choir.]

On a hill which is somewhat precipitous to the north, but is of gentle ascent in other directions, stands the Castle of Windsor, situated in Berkshire, about twenty-two miles from London. "It enjoyeth," says our old English topographer Camden, "a most delightful prospect round about; for right in the front it overlooketh a vale, lying out far and wide, garnished with corn-fields, flourishing with meadows, decked with groves on either side, and watered with the most mild and calm river Thames: behind it arise hills every where, neither rough nor over high, attired as it were with woods, and even dedicated as it were by nature to hunting and game." The magnificent castle which crowns this eminence is associated with some of the most interesting events and persons in the history of our country. It has witnessed all the pomp of chivalry, and its courts have rang with the feasts and tournaments of the Edwards and Henries. Kings were born here,—and here they are buried; and after every change of fashion and opinions, it is still the proudest residence of the sovereign of England, as it was seven centuries ago. The parliament, within these few years, has thought fit to bestow very large sums upon the complete repair of this castle; and we can not think the amount ill bestowed, for the ancient recollections of a people are amongst its best possessions.

There is scarcely a point within a few miles distance where the Castle of Windsor is not seen to great advantage. To the traveller upon the Bath road it presents its bold northern front, which comprises the longest continuous range of its buildings. On the road to Windsor, by Datchet, the eastern front, with its four grand towers, appears of itself to exceed most other edifices in magnitude. To the great Park the southern front is displayed; and when this part is viewed from the extremity of the fine avenue called the Long Walk nothing can appear more stately. In every situation the Round Tower rises above the other buildings, and arrests the eye by its surpassing dimensions. Burke has well characterized it as "the proud keep of Windsor." Sir John Denham, in his poem of Cooper's Hill (an eminence overlooking Runnemede), describes the majestic appearance of Windsor in the quaint and exaggerated tone of the poetry of his day:—

"Such seems thy gentle height, made only proud
To be the basis of that pompous load,
Than which a nobler weight no mountain bears
But Atlas only which supports the spheres."

The visitor to Windsor, upon turning up the street (Castle Street) which leads to the Castle, will have the south front presented to him as it is represented in the wood-cut at p. 252, numbered 2. The improvements that have been made in this part within the last few years are most striking. The road now leads boldly up to the Castle; and the observer looks without interruption upon the rich woods of the adjacent parks. A very short time ago a number of contemptible buildings were scattered about the Castle; and even, the superb avenue, the Long Walk, was deprived of its natural object —(the object doubtless for which it was planted)—that of forming a road to the principal entrance to the Castle, by the avenue and the entrance being crossed by a large plastered house and offices called the Queen's Lodge. All these excrescences have been judiciously removed.

The southern entrances to the Castle are reserved for private use. The visitor will approach it through what is called the Lower Ward. He enters into this ward by a noble gateway, with two towers, built by Henry VIII. The first object which arrests his attention, is the Chapel of St. George—a building unrivalled in England or in Europe, as a perfect specimen of that richly ornamented Gothic architecture, which prevailed in the latter end of the 15th century and the beginning of the 16th. This is represented in the wood-cut at p. 253, numbered 5. Immediately to the east of this fine chapel is an ecclesiastical building of later erection, called Wolsey's Tomb-house; which is now used as the dormitory of the Royal Family. The buildings opposite St. George's Chapel are the residences of the decayed military officers, called the Poor Knights of Windsor. The bold tower which terminates this row of buildings, as well as the opposite tower called the Winchester (from its being the residence of William of Wykeham, Bishop of Winchester, the architect of the castle,) are the best preserved, without much change, of the more ancient parts of the whole fabric. On the right as he proceeds, the visitor looks down over a low battlemented wall, upon what was once the moat of the Round Tower. It appears to have been in part a garden, as long since as the time of James I. of Scotland, who was detained here for some time, and has celebrated this solace of his imprisonment in one of his poems*. The tower itself rises in stern grandeur out of this depth. The mound upon which it is built is no doubt artificial. This immense tower has been considerably elevated within a few years, in common with many other parts of the Castle.

Proceeding through a gateway of two towers, whose low portal indicates its antiquity and its employment for defence, the visitor finds himself within the magnificent quadrangle of the palace. On the north are the state apartments, in which is included the celebrated Hall of St. George:—on the east and south the private apartments of the King and his Court. The state apartments are exhibited to strangers, as we shall more particularly mention. Nothing can be more imposing than the general effect of this quadrangle. Every part is now of a uniform character. We look in vain for the narrow grated windows and pierced battlements of the times of feudal strife, when convenience was sacrificed to security. These characteristics of a martial age were swept away by Charles II., who substituted the architectural style of the age of Louis XIV. than which nothing could have been in worse taste. In the recent alterations of the Castle, the architect has most judiciously preserved the best characteristics of old English domestic architecture. The wood-cut in p. 252, numbered 3, may give some notion of the richness and grandeur of this quadrangle.

Returning a short distance, the entrance to the terrace presents itself to the visitor. After descending a flight of steps, the scene is totally changed. A prospect, unrivalled in extent and beauty, bursts upon the sight. Few persons can look upon this scene without emotion. The eye delightedly wanders over the various features of this remarkable landscape. It traces the Thames gliding tranquilly and brilliantly along, through green and shadowy banks—sometimes presenting a broad surface, and sometimes escaping from observation in its sudden and capricious windings;—it ranges as far as the distant hills—it counts the numerous turrets and spires of the neighbouring villages—or it reposes upon the antique grandeur of Eton College. Gray has beautifully described this magnificent prospect in well-known lines:—

———"From the stately brow
Of Windsor's heights th' expanse below
Of grove, of lawn, of mead survey,
Whose turf, whose shade, whose flowers among
Wanders the hoary Thames along
His silver winding way."

The north side of the terrace is constantly open to the public; and this is by far the finest part. To the eastern side, admittance is only granted on Saturdays and Sundays. At the north-east angle of the terrace, the northern front of the Castle is exhibited as shown in the wood-cut at p. 253, numbered 4.

The earliest history of Windsor Castle, like that of many other ancient buildings, is involved in some obscurity. It is doubtful whether in the time of William the Conqueror, and of his son Rufus, it was used as a

* A notice of this interesting personage will be found at the end of this article.

residence; but it was certainly then a military post. At Old Windsor, a village about a mile and a half from the present castle, there was a Saxon palace, which was occasionally inhabited by the kings of England. Henry I. held his court there in 1105 and 1107; but having enlarged the adjacent castle with "many fair buildings," he, according to the Saxon Chronicle, kept the festival of Whitsuntide there in 1110. In the time of Stephen, the Castle, according to Holingshed's Chronicle, was esteemed the second fortress in the kingdom. Henry II. and his son held two parliaments there. Upon the news of his brother Richard's imprisonment in the Holy Land, John took possession of the Castle; and after his accession to the throne remained there, as a place of security, during his contests with the barons. Holingshed says, that the barons, having refused to obey the summons of the King to attend him in his own castle, he gave them the meeting at Runnemede, which ended in the signature of Magna Charta. The fortress sustained several changes of masters during the wars between the Crown and the Nobility, which broke out again in the reign of John, and of Henry III. Windsor Castle was the favourite place of residence of Edward I. and II.; and here Edward III. was born. During the long reign of this monarch, the Castle, according to its present magnificent plan, was commenced, and in great part completed. The history of the building furnishes, in many respects, a curious picture of the manners of the feudal ages.

At a period when no man's possessions were thoroughly assured to him by equal laws,—when the internal peace of kingdoms was distracted by the pretensions of rival claimants to sovereignty,—and when foreign wars were undertaken, not for the assertion of national honour or the preservation of national safety, but at the arbitrary will of each warlike holder of a throne, personal valour was considered the highest merit; and the great were esteemed, not for their intellectual acquirements and their moral virtues, but for their gallantry in the tournament and their ferocity in the battle-field. Amongst the legends of the old chroniclers and romance-writers (and there was originally small difference in the two characters), the most favourite was the story of King Arthur and his Knights of the Round Table. Froissart, the most amusing of chroniclers, says, that Windsor was the seat of the solemnities of the Round Table, in the sixth century: and later historians affirm that Edward III. in a solemn just (tournament), held at Windsor in the eighteenth year of his reign, revived the institution. Walsingham, the historian, states, that upon this occasion Edward built a round chamber, two hundred feet in diameter, for the deliberations and festivals of the companions in arms that he gathered about him. This strange house was itself called the Round Table. It is probable that it was a temporary structure; for, within a short time after, various commissions for appointing surveyors and impressing workmen were issued; and in 1356, William of Wykeham, then one of the king's chaplains, was appointed architect of the various buildings which Edward's taste for magnificent display had projected. In one year three hundred and sixty workmen were impressed, to be employed at the king's wages. Some of them having secretly left Windsor to engage in other employments for greater wages, writs were issued for their committal to prison, and to prohibit all persons from engaging them under severe penalties. Such were the modes in which the freedom of industry was violated, before the principles of commercial intercourse were fairly established. Had workmen been at liberty to engage with whom they pleased there would have been no want of workmen for the completion of Windsor Castle, or any other public or private undertaking. The capital to be applied to the payment of wages, and the workmen seeking the capital, would have been equally balanced. Impressments of various artificers appear to have gone on for the same object, till the year 1373; after which there are no records of more commissions being issued. It is probable, therefore, that this immense work was completed, as far as Edward III. had contemplated, in about seventeen years from its commencement. Before it had been begun, Edward had founded the Order of the Garter; and during its progress, and after its completion, the festivals of this institution were celebrated at Windsor with every pomp of regal state. Knights-strangers were several times invited from all parts of the world, with letters of safe-conduct to pass and repass the realm; and one of these festivals is particularly described by the chroniclers as exceeding all others in splendour, which was given in honour of John, King of France, who was then a prisoner at Windsor. John, who appears to have been a shrewd observer, is recorded to have said, that he never knew such royal shows and feastings, without some after-reckoning for gold and silver.

Edward III. erected at Windsor a chapel dedicated to St. George, for the especial service of the Order of the Garter; but the present beautiful chapel is of later date. It was begun by Edward IV., who found it necessary to take down the original fabric, on account of its decayed state. The work was not completed till the beginning of the reign of Henry VIII. So beautiful a monument of architectural skill could not have been hurried forward as the ruder buildings of the Castle were.

With the exception of occasional high pageantries on the festival of St. George, Windsor Castle does not appear to have been the scene of many public solemnities after the reign of its chivalrous founder. Richard II., however, heard here the appeal of high treason brought by the Duke of Lancaster against the Duke of Norfolk. But it was often the favourite country residence of our kings; several of whom, particularly Henry VII., continued to make various additions and improvements. There is a curious poem by the Earl of Surrey, who was confined in the Castle for violating the canons of the church, by eating flesh in Lent, which presents the best picture we have of the kind of life which the accomplished gallants of the English court led in our country palaces, at a period when refinement had not taken away the relish for simple pleasures. He describes

"The large green courts where we were wont to hove*
With eyes cast up into the maiden's tower;"

and he goes on to contrast his painful imprisonment with his former happiness amongst "the stately seats," "the ladies bright," "the dances short," "the palm-play†," "the gravel-ground‡," "the secret groves," and "the wild forest,"

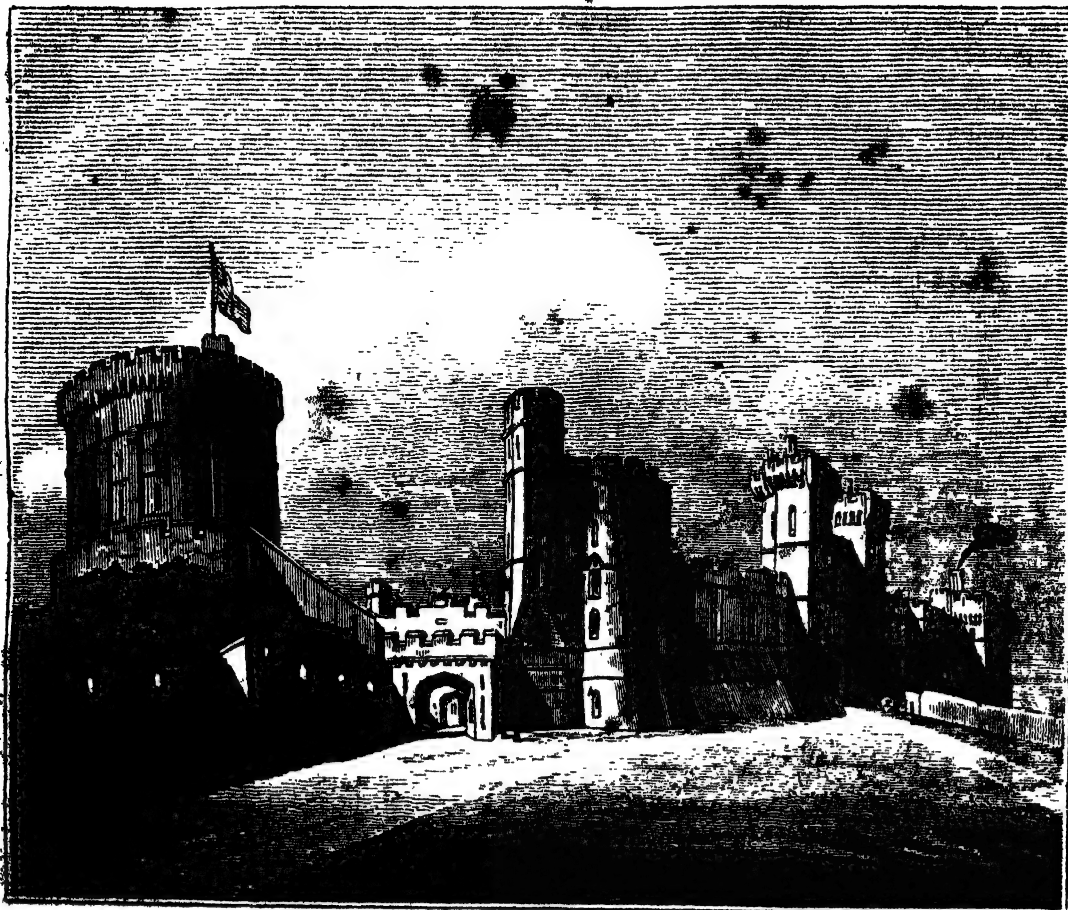
"With cry of hounds, and merry blasts between,
Where we did chase the fearful hart of force§."

There must have been somewhat of tediousness in such a life, for courtiers possessing fewer intellectual resources than Lord Surrey, before letters were generally cultivated, and the manifold enjoyments of taste awakened; and it is probable that the uninstructed high-born engaged in state intrigues, or stirred up useless wars, as much for the desire of excitement, as from less common motives.

The age of Elizabeth brought with it a love of letters, and here "the maiden-queen" occasionally retired from the cares of state, to dictate verses to her private secretary, or receive the flatteries of the accomplished Leicester. There is in the State-Paper Office an original manuscript translation of Horace's Art of Poetry, composed by Elizabeth under such circumstances. This queen built the north terrace, and a gallery, still called after her name, and retaining the peculiar style of the architecture of her day. We have seen some original orders for various repairs of the Castle, which show how little

* Loiter. † Fives. ‡ For tournaments.

§ Surrey's Poem, which is very interesting as a specimen of English composition, is given in a subsequent page.



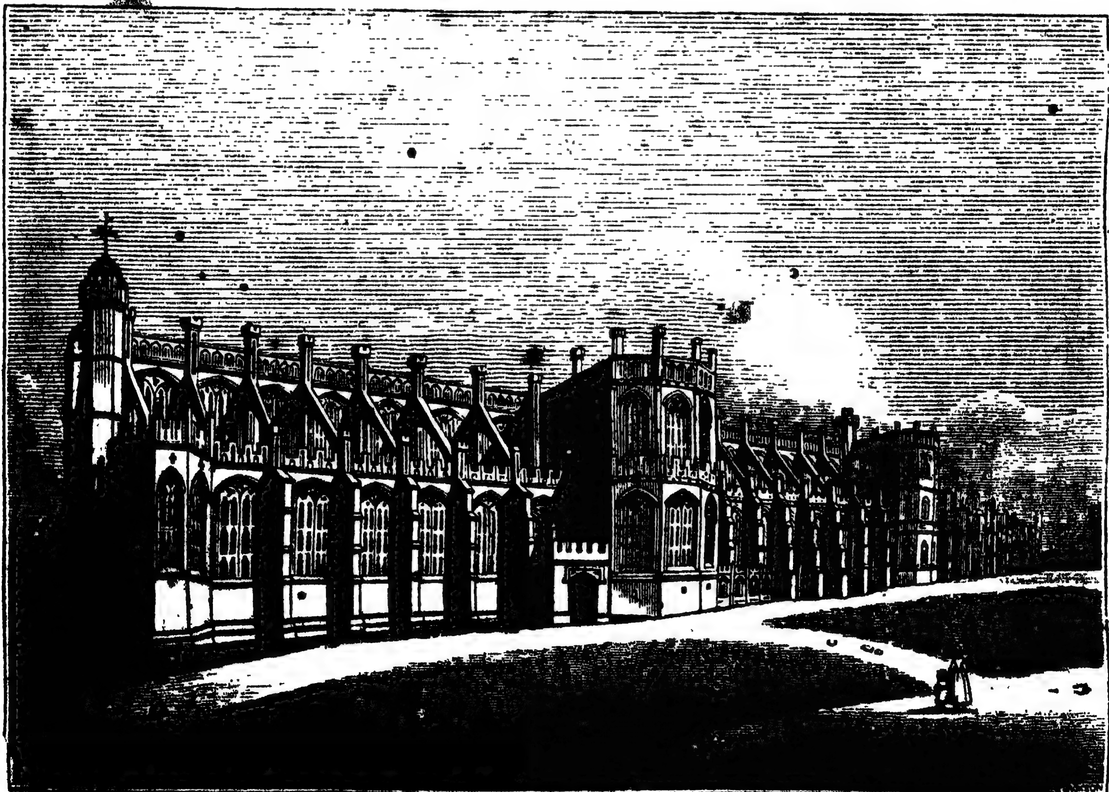
[2. Windsor Castle. Round Tower, and South Front.]



[3. Windsor Castle. Great Quadrangle.]



[4. Windsor Castle. North Front and Terrace.]



[5. St. George's Chapel, Windsor. South Front.]

private accommodation was regarded in these days of public pageantry. The maids of honour requested to have the boarded partitions of their chambers carried up to the ceilings, as the pages could otherwise gaze in upon them, as they passed through the passages. There can be no doubt that an English palace of the 15th and 16th centuries had much fewer comforts than the most unpretending dwelling of a tradesman of the present day. The furniture was scanty and cumbrous; the linen was exceedingly scarce; of porcelain there was none; of glass scarcely any. The floors were covered with dirty rushes; the doors had crazy fastenings. Henry VIII. carried a smith about with him, with padlock and chain, to fasten "the door of his Highness' chamber;" and the cost and quality of the various materials for a new gown which the same king presented to Anne Boleyn, are recorded with a minuteness and solemnity which the humblest servant-maid would now scorn to bestow upon her finest holiday suit*.

Windsor Castle was garrisoned by the parliament during the great civil war of Charles I.; and it was the last prison of that unfortunate monarch. Upon the restoration, Charles II. bestowed upon the Castle the doubtful honour of repairing it according to his foreign taste. We have no accurate records of what he destroyed; but the probability is, that in remodelling the interior he swept away some of the most valuable memorials that existed of the style of living amongst his predecessors. St. George's Hall was covered with paintings by Verrio, as were the ceilings of all the other state apartments; and truly nothing can be more disgusting than the nauseous flattery and bad taste of these productions. Most of the miserable improvements, as they were called, of this king, have been swept away from the exterior of the Castle; and, in many particulars, from the interior. St. George's Hall is once more a Gothic room, such as the "invincible knights of old" might have feasted in. Charles II., however, carried the terrace round the east and south fronts.

Queen Anne frequently resided at Windsor. In the reigns of the first and second Georges, it was neglected. George III. dwelt for many years in a white-washed house at the foot of his own palace; till at length he determined to occupy the old Castle. The apartments were little adapted to the notions of modern comfort, but the Royal Family continued to reside here till the death of the King. George IV. inhabited the Castle as it was, for a few months in 1823; but in 1824, its general decay and want of accommodation were brought under the notice of parliament. Commissioners were appointed for superintending the alterations, and a large sum was voted for the first outlay. Mr. Wyatville (now Sir Jeffery) was appointed the architect; and from that time till the present, the works have been carried on with unremitting diligence. Little now remains for the completion of the architect's noble design.

It does not fall within the object of this article to give any minute description of the interior of Windsor Castle. The apartments of the King and his Court are as numerous as they are splendid. Round the east and south sides of the quadrangle runs a corridor, forming a magnificent gallery above, and connecting the various parts of the immense range of offices below. The principal floor of this corridor is superbly furnished with pictures and statues. The chief apartments of the King and Queen are in the south-eastern tower, and the eastern front. The dining, drawing, and music rooms are of extraordinary dimensions, forming that fine suite whose grand oriel windows look out upon the eastern terrace. They are connected, at the north-eastern angle, with the state apartments, some of which, particularly St. George's Hall, are used on occasions of high festival.

The state apartments are exhibited daily to the public. Several of them have been completely remodelled, under the parliamentary commission for the repairs of the Castle. The guard-room is now fitted up with great appropriateness: one of the most remarkable objects is a bust of Lord Nelson, having for its pedestal a portion of the mainmast of the Victory, his own ship, on the deck of which he gloriously fell. St. George's Hall, as we mentioned before, has been entirely purified from the productions of the false taste of the time of Charles II. An adjoining chapel has been added to the original hall; so that it is now an oblong room of vast length, with a range of tall pointed-arch windows looking upon the square. Its walls, panelled with dark oak, are hung with the portraits of successive sovereigns of the Order of the Garter; and heraldic insignia of the ancient knights are borne on shields which surround the splendid room. Of the other new state apartments, the principal are the ball-room, glittering with burnished gold; and the Waterloo gallery, in which are hung the fine series of portraits painted by Sir Thomas Lawrence, of the princes, warriors, and statesmen, who were instrumental in forwarding that great victory.

The remaining state apartments are pretty much in the same condition as they exhibited during the reign of George III. They present an assemblage of such objects as are usually shown in our palaces and noble mansions. Here are state beds, whose faded hangings have been carefully preserved from periods when silk and velvet were the exclusive possessions of the high-born; chairs of ebony, whose weight compelled the sitter to remain in the place of the seat; and tables of silver, fine to look upon, but worthless to use. Here are also the gaudy ceilings of Verrio, where Charles II. and his Queen are humbly waited upon by Jupiter and Neptune; and the profligate who sold his country to Louis XIV. for a paltry bribe, and degraded the English court by every vice, is represented as the pacificator of Europe, and the restorer of religion. But there are better things to be seen than these in the state apartments. There are many pictures of great beauty, and several of transcendent excellence. Here is the celebrated "Misers" of Quentin Matsys, painted, as it is said, by a blacksmith of Antwerp, as a proof of his pretensions to aspire to marry the daughter of a painter of the same place. The blacksmith, however, was no mean artist in other lines; for he is said to have executed the iron tomb of Edward IV. in St. George's Chapel—a most remarkable specimen of elaborate ingenuity. Here is the "Titian and Aretin," one of the finest specimens of the great master of the Venetian school; the "Death of Cleopatra," and the "Venus attired by the Graces," of Guido; the "Charles I. and the Duke of Hamilton," and "the Family of Charles I.," of Vandyck; and "the Silence" of Annibal Caracci. These are paintings, with many others that we cannot afford space to mention, which the best judges of art may come from the ends of Europe to gaze upon. Those who are captivated by gaudy colours, applied to the representation of meretricious charms, may gaze upon "the Beauties of the Court of Charles II."

The Round Tower is also exhibited to the public. There is nothing very remarkable in the apartments, except in the Armoury, where there are some curious specimens of the cumbrous fire-arms that were carried by the infantry in the early days of gunpowder warfare, when matches held the place of flints, and the charge of powder was borne in little wooden boxes, hung about the shoulders. Here are two suits of mail, said to have belonged to John King of France, and David King of Scotland, who were prisoners in this tower. The legend is appropriate, but not trustworthy.

The object at Windsor which is most deserving the lingering gaze of the stranger, and which loses none of its charms after the acquaintance of years is St. George's Chapel. The exquisite proportions, and the rich yet solemn ornaments of the interior of this unrivaled edifice, leave an effect upon the mind which cannot be de-

* See privy-purse expenses of Henry VIII.

scribed. The broad glare of day displays the admirable finishing of its various parts, as elaborate as the joinery work of a cabinet, and yet harmonising in one massive and simple whole. The calm twilight does not abate the splendour of this building, while it adds to its solemnity; for then

"The storied windows richly dight,"

catches the last rays of the setting sun; and as the cathedral chaunt steals over the senses, the genius of the place compels the coldest heart to be devout in a temple of such perfect beauty. The richly decorated roof, supported on clustered columns, which spread on each side like the branches of a grove—the painted windows, representing in glowing colours some remarkable subjects of Christian history—the banners and escutcheons of the Knights of the Garter, glittering in the choir above their carved stalls, within which are affixed the armorial bearings of each Knight Companion from the time of the founder, Edward III.;—all these objects are full of interest, and powerfully seize upon the imagination. Though this building and its decorations are pre-eminently beautiful, it is perfectly of a devotional character; and if any thing were wanting to carry the thoughts above the earth, the observer must feel the vanity of all greatness and all honour, save the true and imperishable glory of virtue, when he here treads upon the graves of Edward IV. and Henry VI., of Henry VIII. and Charles I., and remembers that, distinguished as these monarchs were for contrasts of good and evil fortune, the pride and the humility, the triumphs and the degradations, of the one and the other, are blended in the grave—

"Together meet th' oppressor and th' oppress'd"—

and they are now judged, as they wanted or exhibited those Christian excellencies which the humblest amongst us may attain. We shall not attempt any description of the various parts of this chapel. The wood-cut in the front of this number exhibits the interior of the choir.

There are not many monuments possessing merit as works of art in St. George's Chapel. The cenotaph of Princess Charlotte is a performance of some excellence in particular figures; but as a whole it is in vicious taste. Edward IV. is buried here, beneath the steel tomb of Quentin Matsys; his unhappy rival Henry VI. lies in the opposite aisle, under a plain marble stone. Henry VIII. and Charles I. are entombed under the choir, without any memorial. At the foot of the altar is a subterranean passage communicating with the tomb-house, in which is the cemetery of the present race of kings.

The Round Tower, the ancient Keep of the Castle, is famous in the romance of history as the prison for many years of King James I. of Scotland, a true as well as a royal poet. The youth of this prince was passed in the Castle of St. Andrews, under the care of one of the finest spirits of that age, Bishop Henry Wardlaw, who founded the oldest university of Scotland. In 1405, when James had reached the age of fourteen, being then, by the death of his elder brother, David, Duke of Rothsay, the heir to the crown, it was determined to send him for greater security to the court of France. On his voyage, however, although a truce then subsisted between England and Scotland, he was seized near Flamborough Head by the ships of Henry IV., and carried with all his attendants to London. He remained in captivity during all the reign of that King, and also throughout that of his successor, although he had become King of Scotland by the death of his father, Robert III., who died of a broken heart, about a year after thus losing his only remaining son. During this prolonged detention, James, although treated with the show of respect appertaining to his rank, appears to have been, for a considerable time at least, held in strict durance. He was confined for two years in the Tower of London; but Windsor, according to tradition, was the place in which his years of captivity were mostly spent. This at least is the spot upon which his love and genius have left their immortal light. It was while imprisoned here that, looking from his high window in the keep, he first beheld walking in the garden below, the Lady Jane Beaufort, the grand-daughter of John of Gaunt, and consequently a near relation of the royal house. This lady, who was a person of distinguished beauty, made an immediate impression on the heart of the captive prince. He has himself related the story of his passion in his poem called the *King's Quhair*, (that is, the King's Quire or Book,) which he appears to have composed after he returned to his native country, and which is not only the eldest production of the Scottish muse, but by far the noblest poetical work of which our language has to boast for at least a century and a half after the death of Chaucer. In melody of verse, indeed, tenderness of sentiment, and picturesque description, it betokens throughout the worthy pupil and follower of that great master.

James was at last liberated, in the beginning of the year 1424, by Henry VI., on condition of his subjects undertaking to pay a sum of £40,000, which, oddly enough, was not demanded as his ransom, but as compensation for the expense of his maintenance, at the rate of £2000 a year for the nineteen years of his detention. Before leaving England, he married the lady who had won his heart before he could offer her his hand, and she accompanied him to Scotland to share his throne. The latter portion of his life was almost as strangely variegated as his earlier years had been by the contrasting colours of romance. The light burned brightly for a short space, and was then quenched in blood. "He found," says Mr. Washington Irving, who has devoted a paper in his Sketch Book to this interesting royal bard, "his kingdom in great confusion, the feudal chieftains having taken advantage of the troubles and irregularities of a long interregnum to strengthen themselves in their possessions, and place themselves above the power of the laws. James sought to found the basis of his power in the affections of his people. He attached the lower orders to him by the reformation of abuses, the temperate and equable administration of justice, the encouragement of the arts of peace, and the promotion of every thing that could diffuse comfort, competency, and innocent enjoyment through the humblest ranks of society. He mingled occasionally among the common people, in disguise; visited their fire-sides; entered into their cares, their pursuits, and their amusements; informed himself of the mechanical arts, and how they could best be patronised and improved; and was thus an all-pervading spirit, watching with a benevolent eye over the meanest of his subjects. Having in this generous manner made himself strong in the hearts of the common people, he turned himself to curb the power of the factious nobility; to strip them of those dangerous immunities which they had usurped; to punish such as had been guilty of flagrant offences; and to bring the whole into proper obedience to the crown. For some time they bore this with outward submission, but secret impatience and brooding resentment. A conspiracy was at length formed against his life, at the head of which was his own uncle, Robert Stewart, Earl of Athol, who, being too old himself for the perpetration of the deed of blood, instigated his grandson, Sir Robert Stewart, Sir Robert Graham, and others of less note, to commit the deed. They broke into his bed-chamber, at the Dominician Convent, near Perth, where he was residing, and barbarously murdered him by oft-repeated wounds. His faithful Queen, rushing to throw her tender body between him and the sword, was twice wounded in the ineffectual attempt to shield him from the assassin, and it was not until she had been forcibly torn from his person, that the murder was accomplished.

"It was the recollection of this romantic tale of former

times, and of the golden little poem which had its birth-place in this Tower, that made me visit the old pile with more than common interest. The suit of armour hanging up in the hall, richly gilt and embellished, as if to figure in the tournay, brought the image of the gallant and romantic prince vividly before my imagination. I paced the deserted chambers where he had composed his poem; I leaned upon the window, and endeavoured to persuade myself it was the very one where he had been visited by his vision; I looked out upon the spot where he had first seen the Lady Jane. It was the same genial and joyous month; the birds were again vying with each other in strains of liquid melody; every thing was bursting into vegetation, and budding forth the tender promise of the year. Time, which delights to obliterate the sterner memorials of human pride, seems to have passed lightly over this little scene of poetry and love, and to have withheld his desolating hand. Several centuries have gone by, yet the garden still flourishes at the foot of the tower. It occupies what was once the moat of the keep; and though some parts have been separated by dividing walls, yet others have still their arbours and shaded walks, as in the days of James, and the whole is sheltered, blooming, and retired. There is a charm about a spot that has been printed by the footsteps of departed beauty, and consecrated by the inspirations of the poet, which is heightened, rather than impaired, by the lapse of ages. It is, indeed, the gift of poetry to hallow every place in which it moves; to breathe round nature an odour more exquisite than the perfume of the rose, and to shed over it a tint more magical than the blush of morning.

"Others may dwell on the illustrious deeds of James, as a warrior and a legislator; but I have delighted to view him merely as the companion of his fellow men, the benefactor of the human heart, stooping from his high estate to sow the sweet flowers of poetry and song in the paths of common life. He was the first to cultivate the vigorous and hardy plant of Scottish genius, which has since become so prolific of the most wholesome and highly flavoured fruit. He carried with him into the sterner regions of the north, all the fertilizing arts of southern refinement. He did every thing in his power to win his countrymen to the gay, the elegant, and gentle arts, which soften and refine the character of a people, and wreath a grace round the loftiness of a proud and warlike spirit. He wrote many poems, which, unfortunately for the fulness of his fame, are now lost to the world; one which is still preserved, called 'Christ's Kirk of the Green,' shows how diligently he had made himself acquainted with the rustic sports and pastimes, which constitute such a source of kind and social feeling among the Scottish peasantry; and with what simple and happy humour he could enter into their enjoyments. He contributed greatly to improve the national music; and traces of his tender sentiment, and elegant taste, are said to exist in those witching airs still piped among the wild mountains and lonely glens of Scotland. He has thus connected his image with whatever is most gracious and endearing in the national character; he has embalmed his memory in song, and floated his name to after-ages in the rich stream of Scottish melody. The recollection of these things was kindling at my heart, as I paced the silent scene of his imprisonment. I have visited Vaucluse with as much enthusiasm as a pilgrim would visit the shrine at Loretto; but I have never felt more poetical devotion than when contemplating the old tower and the little garden at Windsor, and musing over the romantic loves of the Lady Jane and the Royal Poet of Scotland."

The poem by the Earl of Surrey, to which we have alluded in page 251, as a remarkable specimen of the English poetry of the 16th century, was originally printed in a small volume, entitled 'Songs and Sonnettes of Henry Earle of Surrey,' in 1557. Lord Surrey was born about 1515, and was beheaded on a vague charge of high treason in 1547.

So cruel prison, how coulde betyde, alas,
  As proude Windsor! where I, in lust and joy,
With a kinges sonne my childishe yeres did passe,
  In greater feast than Priam's sonnes of Troye.

Where eche swete place returnes a taste full sower,
  The large grene courtes where we were wont to hove*,
With eyes cast up into the mayden's tower,
  And easie sighes, such as men draw in love:

The statelie seates, the ladies bright of huve,
  The daunces shorte, long tales of great delight,
With wordes and lookes, that tygers could but ruve,
  Where ech of us did pleade the other's right.

The palme-play†, where, dispoyled for the game‡
  With dazed yies, oft we by gleams of love
Have mist the ball, and got sight of our dame,
  To bate her eyes which kept the leads above.

The gravel ground, with sleves tied on the helme,
  On fomyng horse, with swordes and frendly hartes,
With cheare§ as though one should another whelme,
  Where we have fought and chased oft with dartes.

The secret groves, which oft we made resounde,
  Of pleasant playnt, and of our ladies praise,
Recording ofte what grace ech one had founde,
  What hope of speede, what drede of long delayes.

The wilde forest, the clothed holtes|| with grene,
  With raynes avayled¶, and swift ybreathed horse,
With crie of houndes, and merry blasts betwene,
  Where we did chase the fearful harte of force.

The wide vales** eke, that harbourd us ech night,
  Wherewith, alas, reviveth in my brest
The swete accord! Such slepes as yet delight:
  The pleasant dreames, the quiet bed of rest.

The secret thoughts imparted with such trust;
  The wanton talke, the divers change of play;
The frendship sworne, ech promise kept so just,
  Wherewith we past the winter night away.

And with this thought the bloud forsakes the face;
  The tears berayne my cheeks of deadly huve,
The which as sone as sobbing sighs, alas,
  Upsupped have, thus I my plaint renuve!

"Oh place of blisse, renuver of my woes!
  "Give me accompt, where is my noble fere††,
"Whom in thy walles thou dost ech night enclose
  "To others leefe, but unto me most dere!"

Eccho, alas, that doth my sorrow rew,
  Returnes thereto a hollow sound of playnte,
Thus I alone, where all my freedom grew,
  In prison pine with bondage and restrainte:
And with remembrance of the greater griefe,
  To banish th' lesse, I find my chief reliefe.

* To hove, to loiter in expectation. So Chaucer, Troil. Cress., book v. ver. 33.

† At ball. ‡ Rendered unfit or unable to play.

§ Looks. || Thick woods. ¶ With loosened reins.

** Probably the true reading is *wales* or *walls*; that is, lodging apartments, &c. †† Companion.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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THE TALIPOT TREE OF CEYLON.



[Talipot Palms in different stages of growth.]

There are few objects in the vegetable kingdom more remarkable and beautiful, or more useful to man, than the Talipot-tree, which is a species of palm (the *corypha umbraculifera* of Linnæus) peculiar to the Island of Ceylon, and the Malabar coast*. Robert Knox says that it is as big and as tall as a ship's mast, but Cordiner gives more definite dimensions by stating that one which he measured was a hundred feet high and five feet in circumference near the ground. The stem of this tree is perfectly straight; it gradually diminishes as it ascends, the circumference of the upper part being about half that of the base: it is strong enough to resist the most violent tropical winds. It has no branches, and the leaves only spring from its summit. These leaves, which when on the tree are almost circular, are of such prodigious diameter that they can shelter ten or a dozen (Knox says from fifteen to twenty) men, standing near to each other. The flower of the tree which shoots above the leaves is at first a cluster of bright yellow blossoms, exceedingly beautiful to the eye, but emitting an odour too strong and pungent to be agreeable. Before its development the flower is enclosed in a hard rind, which rind, upon the expansion of the flower, bursts with a sharp noise. The flower shoots pyramidically to a great height, frequently adding as much as thirty feet to the elevation of the tree. From the flower proceed the fruit or seeds, which are as large as our cherries, and exceedingly numerous, but not eatable: they are only useful as seeds to reproduce and multiply the tree. It appears that the natives do not sow them, but leave that operation entirely to nature. The flower and the fruit only appear once on one tree. Their appearance betoken that the tree has attained to old age, which, according to the natives, it does in a hundred years: Ribeyro, a Portuguese writer, says, in about thirty years, which is more likely to be correct. As soon as the fruit or seeds are ripe, the tree dries up and decays so rapidly that in two or three weeks it is seen prostrate and rotting on the ground. Knox asserts, that if the tree be cut down before it runs to seed, the pith, largely contained within the stem, is nutritious and wholesome, and adds that the natives take this pith, " and beat it in mortars to flower, and bake cakes of it, which taste much like to wheat bread, and it serves them instead of corn before their harvest be ripe." We have not found these cakes mentioned by any other writer on Ceylon; but as Knox

* It is said to be found also in the Marquesas and Friendly Islands.

was so veracious and correct, we may admit that the natives were accustomed to make them. A better known fact about the uses of the inner parts of the tree is that sago is made from them. The stem or trunk of the talipot, like that of most other palms, is extremely hard without, but soft and spongy within, the greater part of its diameter being a soft brownish cellular substance. The sago is made by beating the spongy part of the stem in a mortar, by which means the fecula is procured. Still, however, the great usefulness of the tree is in its leaves. Growing on the tree, these leaves when expanded, are of a beautiful dark green colour; but those chiefly used are cut before they spread out, and have, and retain for ages, a pale brownish yellow colour, not unlike old parchment. Their preparation for use is very simple: they are rubbed with hard, smooth pieces of wood, which express any humidity that may remain, and increase their pliability, which is naturally very great. The structure of this wonderful leaf and the disposition of its fibres will be best understood by a glance at the engraving at the head of this article, in which the construction of the leaves is shown, particularly by those in the right-hand corner.

Our readers will there see that it is made precisely like a fan, and like a fan it can be closed or expanded, and with almost as little exertion. It is in fact used as a fan by the natives of Ceylon, and is at the same time their only umbrella and parasol; in addition to which uses it forms their only tent when they are in the field, and, cut up into strips, it serves them to write upon instead of paper.

The leaf is so light that an entire one can be carried in the hand; but as this, from its great size when expanded, would be inconvenient, the natives cut segments from it, which they use to defend themselves from the scorching rays of the sun, or from the rains. The narrow part is carried foremost, the better to enable those who use them, to penetrate through the woods and thickets with which most of the country abounds. No handles are used, but the two sides of the leaf are grasped by the bearer. "This," says Knox, in his quaint manner, "is a marvellous mercy which Almighty God hath bestowed upon this poor and naked people in this *rainy country!*" He ought to have added, in this *hot country*, for the heats of Ceylon, whose mean temperature is 81°, are frequently, and for long periods, tremendous, and the talipot-leaf is quite as valuable as a protection against them as against rain.

However much water may fall on the leaf it imbibes no humidity, remaining dry and light as ever. The British troops in their campaign in the jungles against the Cingalese in 1817 and 1818, found to their cost how excellent a preservative it was against wet and damp. The enemy's musket-men were furnished, each with a talipot-leaf, by means of which they always kept their arms and powder perfectly dry and could fire upon the invading forces; whilst frequently the British muskets, which had no such protection, were rendered useless by the heavy rains, and the moisture of the woods and thickets, and our men consequently unable to return the fire of the natives.

As tents, the talipot-leaves are set up an end as described in the adventures of Robert Knox, No. 75, of our Magazine. Two or three talipot-umbrellas thus employed make an excellent shelter, and from being so light and portable, each leaf folding up to the size of a man's arm, they are admirably adapted for this important service. The chiefs, moreover, have regularly formed square tents made of them. In these the leaves are neatly sewed together and laid over a light frame-work; the whole is light and can be packed up in a very small compass.

When used in lieu of paper, they are, as we have mentioned, cut into strips, (those which we have seen are about 15 inches long by 3 broad,) soaked for a short time in boiling water, rubbed backward and forward over a smooth piece of wood to make them pliable, and then carefully dried. The Cingalese write or engrave their letters upon them with a stylus, or pointed steel instrument, and then rub them over with a dark-coloured substance, which only remaining in the parts etched or scratched, gives the characters greater relief, and makes them more easy to read. The colouring matter is rendered liquid by being mixed with cocoa-nut oil, and when dry is not easily effaced. On common occasions they write on the leaf of another species of palm-tree, but the talipot is used in all government despatches, important documents, such as title-deeds to estates, &c., and in their books. A Cingalese book is a bundle of these strips tied up together*. As even the lawyers and the learned in this country are very deficient in chronological knowledge, great confusion occurs as to dates; and it is very common to see a Cingalese judge attempting to ascertain the antiquity of a document produced in court by smelling and cutting it.

The oil employed in the writing imparts a strong odour which preserves it from insects, but this odour is changed by age. The talipot, however, appears to have in itself a natural quality which deters the attack of insects and preserves it from the decay of age even without the oil. It may be worth while observing that the Cingalese who engrave the most solemn of their deeds, such as the foundation of, or donations to a temple, on plates of fine copper, which are generally neatly edged with silver, always make these plates of precisely the same shape as the talipot strips used for writing.

Besides all the uses described, the Cingalese employ the talipot-leaf extensively in thatching their houses. They also manufacture hats from it; these hats are made with brims as broad as an out-stretched umbrella, and are chiefly worn by women nursing, to defend them and their infants from the heat.

The talipot is not a very common tree at present, and is rarely seen growing by those who only visit the coasts of the island and do not penetrate into the interior. It seems to grow, scattered among other trees, in the forests. In a view of the town of Kandy, as it was in 1821, a fine specimen of the talipot, in flower, is seen close to a group of cocoa-nut trees.

THE LABOURERS OF EUROPE.—No. 6.

In treating of the labourers of such an extensive country as France, it would be unreasonable to speak of them as one class. There are great and material differences of localities, of climate, and of habits, between populations placed at a distance of six or seven hundred miles from each other,—between the inhabitants of the coasts of the Mediterranean and those who live near the British Channel,—between those on the banks of the Rhine and those on the shores of the great Atlantic Ocean. Their respective wants, the produce of the soil, the wages of labour in each of their divisions, are essentially different. The great divisions of France may be considered to be, 1st. The north and north-eastern provinces. 2d. The central provinces. 3d. The southern provinces; and, 4th. The western provinces. Again, we must not judge of the condition of French labourers, and French villagers, by those we meet on the high roads near Paris and other great cities; but we ought to look at those in the interior, at a distance from the great markets and thoroughfares, and who, in a country where large towns are few and far between, constitute by much the great majority of the whole population. We have endeavoured to extract the best information we could collect from trustworthy authorities of the condition of

* Many of the books shown in Europe for the Egyptian papyrus, are made of the leaves of the talipot.

the French labourers at three different epochs; namely, 1st. Before the French revolution. 2d. Under Bonaparte's government. 3d. Since the last peace, and up to the present time.

The depression of French farmers and labourers before the revolution may be ascribed to two principal sources; 1st. The bad system of the tenure of the land. 2d. The weight and inequality of taxation.—The tenure of land was of four kinds: 1st. Small properties cultivated by the owners, who were mostly, at the same time, in the condition of daily labourers. These, contrary to the current supposition of people in our days, were very numerous even before the revolution. Mr. Arthur Young, who was intimately acquainted with the subject, states that one-third of the land in France was so divided. At the death of the owner these little properties were subdivided, in some instances among all the sons, and in other places among all the children, male and female. "At last," says Mr. Young, "you find a family living, or rather starving, upon half an acre of ground, with one single fruit-tree standing upon it." 2d. Rent-farms, as in England, but generally of small size. These were found chiefly in the northern provinces, and hardly extended over a sixth part of the kingdom. 3d. Feudal tenures, granted by the lords of the ground, with the conditions of census, forfeiture, fines, services, &c. These were scattered all over the kingdom. 4th. Lands held by *metayers*, who gave the landlord one-half of the produce in kind, the latter furnishing the cattle and one-half of the seed, and the occupier providing the implements of agriculture. In some places the landlord paid also one-half of the taxes. This mode of holding lands was by far the most prevalent over the greater part of the kingdom, and as it continues to prevail to this day, in spite of all political and other changes, we shall have occasion to revert to it again hereafter. There were also speculators (middle-men), who rented vast tracts of land, and then sub-let them again in small portions to metayers, who gave them one-half of the produce. The consequences of the metayer system are obvious—it rears up a population of paupers. The metayer, after paying one-half of the produce of his small farm, could hardly derive a bare subsistence for himself and family. His implements were wretched, and sparingly provided. The repairs of buildings, the hedges, gates, palings, &c. were likewise neglected; the land deteriorated, there being little or no manure, owing to the deficiency of cattle on the farms. The rotation of crops all over France was bad, consisting of alternate fallow and wheat crops, then fallow, and barley or oats; no turnips, clover, or beans being interposed. Mr. Young, in a work in which he treats professedly of the agriculture of France in his time*, gives the following list of prices of provisions and wages:—Average wages of journeymen in France 19 sols, masons and carpenters 30 sols; at the same time labourers' wages in England were 1*s.* 4½*d.*, or 33 French sols. Meat was then in France 7 sols. per lb., bread 2 sols. In England, at that time, meat was 4¼*d.*, equal to 8½ sols; and bread 1¾*d.*, equal to 3½ sols. By taking the difference in the price *of bread and meat conjointly* between the two countries, it resulted that the English labourer's wages compared to the French were as 25½ to 19. If the difference in the price of bread *alone* is considered, then the wages were alike in both countries. But this would not have been a fair estimate; for, besides meat being almost as essential an article as bread, the French common bread in the country was always of a very inferior quality, being made with a large proportion of rye and other grains, for as to the price of wheat in both countries the difference was trifling. Again, the English peasantry eat a considerable quantity of cheese and butter, and the French hardly any. There is even at this day a great scarcity of good cheese in France; there are but one or two kinds of tolerable cheese made in the country, and those in small quantity, and very dear. Roquefort cheese, which is the best, costs two francs the pound at Paris, 1*s.* 8*d.* English. The reason of the dearness of good meat in France Mr. Young ascribed to the want of artificial meadows: in winter sheep were fed almost entirely upon straw. "The sheep," says he, "are extremely lean; I have not seen a sheep in France that would be called fat in England. Their mutton appears hardly eatable to an Englishman. Beef is very good at Paris and in other large towns, where prime bullocks are sent from Limousin or Normandy; but in the provincial towns and villages old cows are slaughtered, and good beef is as scarce as good mutton." This was written in 1789, and things have somewhat mended since; yet the leading features of Mr. Young's remarks hold good in great measure to this day, as we shall hereafter see.

We now come to the second cause of agricultural depression in France before the revolution, namely, a bad system of taxation. The taxes were of two sorts—direct and indirect. The former consisted chiefly of two heads, *tailles* and *capitation.*

The *taille* was of two sorts, *real* and *personal.* The real taille was a land tax at so much per acre. The personal taille was assessed on the personal estate of each individual, that is to say, his money, rental, houses, profession, *industry*, or either of these. The manner in which it was levied was very arbitrary. Every year the king in council determined the amount of tax to be raised from the whole kingdom. This was then divided among the different provinces, each intendant or king's lieutenant assessing the different districts within his province for their respective shares; and lastly, the elders of each parish, in presence of the justice and syndic, taxed each individual for his quota. No appeal was allowed. In a curious old pamphlet, called 'A compendious History of the Taxes in France,' printed in 1694, during the reign of Lewis XIV., we find the following particulars:—"The great evil of the taille is the unequal manner in which people are assessed by the authorities and by the collectors, who favour their own friends to the detriment of the rest. Industry is taxed, so are talent, exertion, and success. Every improvement a farmer makes on his ground exposes him to a heavier taille. A poor cobbler or other artizan, who has nothing in the world but his labour, is assessed four or five crowns a-year. A baker at Gonesse, near Paris, who has not an inch of land, is assessed for his personal estate 1,200 French crowns." The personal taille was not paid by either the nobility or clergy; but the real taille or land-tax was levied on all estates which were not holden by feudal tenure. The clergy, however, paid what was called a *free gift* to the crown, which was voted at fixed periods in their own assembly, and to which all incumbents contributed their share. There was also a sort of capitation tax on the clergy called the *general tenth*, levied on all except the mendicant friars who had no property.

The early division of the old French monarchy was in two great parts, *Langue d'oc*, or south; and *Langue d'oil*, or north. The latter paid personal taille, while the former paid only the real taille. Burgundy and Britanny, although northern provinces, did not form part of the Langue d'oil: having for a long time constituted independent duchies, they had preserved their own states or parliaments. These provinces, as well as Languedoc and Provence, were therefore called *pays d'etats*, while the rest were called *pays d'election*, or without states, whose inhabitants were taxed by the will of the government, and assessed by their *elus*, or notables. In the former provinces the states were asked by the king for a certain grant, and they ordered the assessment: the nobility,

* Young's Travels in France in the Years 1787–89. 2 vols. 4to. 1794.

clergy, and swordsmen paid according to the value of the land they were in possession of; merchants, artificers, and tradesmen, were assessed according to their station. But day-labourers and other poor persons were not liable to personal taille, and this was a great advantage they had over those in the rest of France. The pays d'etats, however, paid every two years what was called a free gift for the preservation of their privileges, for which purpose all the inhabitants in general were taxed. The conquered provinces, Alsace, Lorraine, Flanders, Franche Comté, and Rousillon enjoyed the same privilege as the state countries.

The capitation tax was levied upon every individual, without exception of rank, from the dauphin to the poorest labourer.

There were numerous taxes on consumption, such as *aides*, or excise duties, upon wine and spirits, levied first in the cellar, on the cask, and afterwards on the retailer, amounting to double the original value. There was besides, and there is still, a general *octroi*, or barrier duty, on every article of provision brought into Paris and other cities. In Lewis XIV.'s time this duty was *9s.* for every bullock, *3s. 6d.* for a calf or pig, *2s. 6d.* for a sheep; other articles, such as fish, poultry, butter, eggs, cheese, vegetables, firewood, &c., paid at the rate of one-fifth of their value.

There was a house-tax at Paris and in other cities; also licences for every shop or trade, including hawkers; a tax on public carriages, toll-duties, registry; stamp on paper, parchment, metals, leather, &c.; taxes on tallow, oil, soap, tobacco, &c.

One of the most oppressive taxes was that on salt. Salt was and still is in France, as well as in most countries of the continent, a monopoly of the government. All proprietors of salt-pits were obliged to sell their salt at a low price into the government stores, from which alone the retailers and the people in general could supply themselves, and this rule was strictly enforced by the most severe penalties. The profit on this article was calculated at several hundred times its original value. It was sold at eleven sols, or five-pence halfpenny the pound. In the country every family was assessed for a certain proportion of salt in proportion to the number of its members, which they were forced to purchase from the officers of the *gabelle*, or revenue. This is still the practice in several states of the continent.

But the worst part of the whole system was that most of these taxes on articles of consumption were farmed to speculators who outbid each other, and paid a large premium for the lease, of which they made of course the most they could by squeezing out of the people much more than what they paid into the treasury. Just before the revolution the farms paid into the treasury about five millions sterling, but it was calculated that they cost the people at least twice as much. The whole revenue of France, including the domains of the crown, the *free gifts* of the clergy and of the state provinces, the additional tenths on the capitation tax, &c., and which, under Lewis XIV., had been raised to 750 millions, or 30 millions sterling, amounted in 1789 to 475 millions of livres, or about nineteen millions sterling. It rose under Necker's administration to 568, or near about twenty-two millions and a half. France now pays more than double that amount, and yet the people do not feel the burthen so heavy as they did then, owing to the better and more equal distribution of taxation, and to the great increase of industry, trade, and national resources.

"In every country," thus wrote Dr. Moore in 1779 *, "there is poverty in the large towns, often produced by vice, idleness, or improvidence, but in France the poorest inhabitants of the capital are often in a better condition than the laborious peasant. The former, by administering to the luxuries or taking advantage of the follies of the great and the wealthy, may procure a tolerable livelihood and sometimes make a fortune, while the peasant cannot without much difficulty earn even a scanty and precarious subistence. In order to retain a favourable notion of the wealth of France, we must remain in the capital, or visit a few trading or manufacturing towns; we must not enter the château of the seigneur, or the hut of the peasant. In the former we shall find nothing but tawdry furniture, and from the other we shall be scared by penury. In every country a failure of crops, or other accidental circumstances, may occasion distress and scarcity among the common people at a particular time: but when there is a permanent poverty through several reigns and for a long tract of years among the peasantry of such a country as France, this seems to me the truest proof of a careless and consequently an oppressive government."

* A View of Society and Manners in France, Switzerland, &c.

Another of the burthens of the French peasantry, was the *corvées*, or forced labour which they were called upon to perform, gratis, for the lord of the manor or feudal estate. This power was left to the discretion of the local agent or steward, and was a source of infinite vexations and oppressions. The service of the corvées had never been regulated by any edict or law. This obnoxious practice, however, was abolished in 1776, several years before the revolution, and its suppression was one of the first acts of Lewis XVI.'s reign. In fact things had begun to improve, when the violence of the revolution threw the whole social system into confusion, and many years of universal distress rolled over France before the labouring classes could derive any benefit from the sweeping change. What these benefits were, and how far they extended, we shall see in a future number.

From what we have said, it will appear that the condition of the French labourers in the last century, although generally depressed, varied considerably in different localities, according as they lived on feudal or free estates, in state provinces or in those without assemblies; it was in truth left a great deal to chance, and the disposition of the local rulers. In several parts, the nobles and landlords lived in harmony and kind intercourse with their tenants and labourers, and then the lot of the latter was tolerably happy. And the effects of this were seen amidst the revolutionary storms that followed. The peasantry of the districts we allude to stood by their landlords, their nobility, and their clergy, against the sweeping decrees of the Paris Convention, and fought long and desperately against the troops of the latter. We need only name La Vendée, to recall these facts to the minds of our readers.

Utility of Dogs.—The dogs of Constantinople belong to every body and to nobody, the streets are their homes; their appearance is between a wolf and a jackal. It is astonishing how they continue their species, exposed to a rigorous winter, and the casualties of a large city. They are littered and reared in the streets. In the summer several die of thirst, *but none are ever known to go mad.* Though a worrying nuisance to walkers, their general utility is obvious; for as the Turks throw the leavings of their kitchens out of doors, the streets would very soon be impassable but for the scavenger-like propensities of the dogs and the storks, assisted occasionally by vultures. As they subsist entirely on charity and what they pick up, instinct teaches them the necessity of a division of labour; and therefore, in the same manner as a well-regulated society of beggars has separate walks for its members, they divide the city and its suburbs into districts. Were a dog found in a strange quarter, he would infallibly be torn in pieces by the resident dogs; and so well are they aware of this, that no argument, not even a bone of roast meat, will induce a dog to follow a person beyond his district; a singular and authenticated fact. We caressed for experiment one of these animals, whose post with many others was near the Mevlevi Khan; we daily fed him till he became fat and sleek, and carried his tail high, and was no longer to be recognized for his former self. With his physical, his moral

qualities improved. He lost his currishness, and when his patrons approached, expressed gratitude by licking their hands, &c.; yet he would never follow them beyond an imaginary limit, either way, where he would stop, wag his tail, look wistfully after them till they were out of sight, and then return to his post. Once only I saw him overstep his limit; he was very hungry and we were alluring him with tempting food; but he had not exceeded twenty yards when he recollected himself, and ran hastily back. I cannot say if any order of precedency is observed in gaining the best stations, as near a butcher's shop or a Khan.—*From Mr. Slade's Travels in Turkey, Greece, &c.*

THE CARTOONS OF RAFFAELLE.—No. 7.

ELYMAS STRUCK WITH BLINDNESS.



The scenery of the Cartoons is here diversified with a Prætorium, or Roman hall of justice. The composition is of that kind in which the middle space is left vacant, the figures being arranged on a semicircular line, and extending from one side of the picture to the other; an arrangement admirably adapted to this subject. The Proconsul Sergius Paulus, surrounded by his officers and lictors, is seated on his tribunal in front of a recess in the centre of the hall. Paul and Elymas are the foremost figures in the composition, placed on each side of the magistrate, and confronting each other. During the first promulgation of Christianity the preaching of the Apostles, and the fame of their miracles, instigated a number of impostors to an assumption of similar

functions; among these, Bar-jesus, called Elymas, "a false prophet and a sorcerer," was one of the most conspicuous; he appears to have obtained considerable credit, and on the arrival of Paul and Barnabas at Paphos, had the audacity to challenge them to a public discussion before Sergius Paulus, with the hope of preventing the proconsul from embracing the Christian faith. The presumption and impiety of Elymas was met by this denunciation from the lips of the apostle: "Behold! the hand of the Lord is upon thee, and thou shalt be blind, not seeing the sun for a season. And immediately," continues the sacred narrative, "there fell on him a mist and darkness, and he went about, seeking some one to lead him by the hand."

Elymas is annihilated by this calamity; he no longer exhibits the front or bearing of the subtle disputant or daring impostor. His whole action—the person bent, the arms and hands stretched out, one leg cautiously advanced, while the other sustains the weight of the figure, all indicate the confused and uncertain feeling of one struck with sudden blindness,—all is expressive of astonishment, affliction, and dismay. The group behind him, amidst much variety of action, is connected by an admirable chain of expression: one of the male figures points to Elymas; the other to Heaven; the female, on the contrary, who is no doubt meant for the wife of Elymas, protests aloud against the infliction, ascribing it to human malice, and pointing indignantly at St. Paul as the author of it. The officer who stands on the steps of the tribune, extends his hand towards the sorcerer, and turning to the surrounding crowd, seems to say, "Behold the judgment which has fallen on him!" while the man on the right of Elymas gazes on his face with such an intensity of wonder and curiosity as gives an air of reality to the whole scene.

Elymas is the personification of detected falsehood: St. Paul appears the image of irresistible truth; simple, erect, decisive, he stands in the calm consciousness of power, and it is only from his upraised arm and finger that we perceive it is from him that the impostor has received his doom. The whole composition is in the highest degree picturesque, although not the slightest sacrifice of propriety is made for that object; an air of decorum even, proper to a hall of justice, is preserved amidst all the excitement of the scene; the figures of the lictors are admirably characteristic, the proconsul himself has a striking air of grandeur and intelligence; his conversion was consequent on the event here represented, but Raffaelle was justified in indicating that essential circumstance by an inscription, as there was no other mode of expressing it.

We have confined our observations on the Cartoons to the qualities of composition, character, and expression; parts of the art which may be considered purely intellectual, and which admit of being conveyed through the medium of engraving. Of the manual execution of the Cartoons, which can only be understood by an inspection of the originals, it may be observed, that having been executed when Raffaelle was in the zenith of his powers, they exhibit throughout the most consummate mastery and decision of hand, without any trace of that timidity which is visible in his earlier performances. The colouring has perhaps generally too great an inclination to red, although, even in this quality, there are occasionally passages of high excellence. At whatever distance they are seen, these Cartoons stand out with the noblest and most perspicuous effect, without the slightest alloy of complexity or littleness. The wish of men of taste that they may form the first ornament of the new National Gallery, when completed, cannot be too often enforced. It would be without excuse if the practice of our artists, or the taste of the public at large, should retrograde materially from just principles of art while such noble examples were before them.

THE MOON.—No. 2.

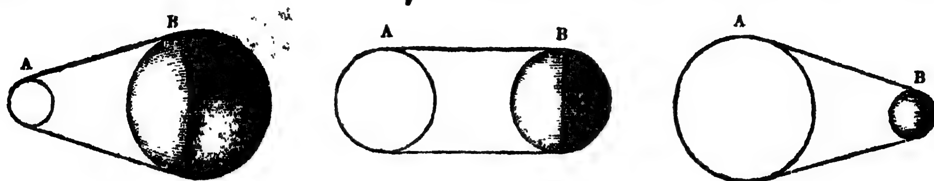
THE various methods by which the motions of the heavenly bodies are represented in popular treatises have this disadvantage, that not being strictly, sometimes not even nearly, correct, they are apt to leave false impressions upon the mind, *after* the time when it becomes necessary to abandon the first suppositions, and take up others which are nearer the truth. Thus we find it stated that the moon moves round the earth *uniformly*, in about twenty-seven days, eight hours, and three-quarters, and always in the same plane, which would lead the beginner to expect that if it *occulted*, or passed over any star in one month, it would occult the same star in the next month. Again, we speak of the moon's orbit as if it were a circle on the sphere of the heavens, which always retained its place, and of the moon's distance from the earth as if it were always the same. We may, however, lay down the following principles, which the reader must bear in mind in every part of this subject.

1. There is nothing in the solar system which does not undergo *sensible* variation, except the times of rotation of the planets round their own axes, the *average* distances of the planets from the sun and of the satellites from their primaries, and the *average* or *mean* times of revolution of the planets round the sun, and of the satellites round their primaries. By the mean time of revolution we mean the average of a large number of revolutions, one hundred for example: thus we should not find any sensible difference between one hundred years and another hundred; or between one hundred months and the next hundred; though there may be a slight difference between one year and the next, and a decided difference between one month and the next. To give a notion of the magnitudes of which we are speaking, we should call two minutes a slight difference between two years, and two hours a decided difference between two months. Even when we say that the mean distances and mean motions are invariable, we only mean that, within the time of human observations, no sensible variation has been observed. With regard to the moon there is a slight variation in her average motion, which though at present causing a difference of only about eleven seconds of a degree in a century, or about the 170th part of her apparent diameter, becomes sensible in a lapse of ages, and was discovered by comparing the asserted time of some Chaldean observations of eclipses, with the times at which these eclipses should have happened, if the *present* rate of motion were always strictly preserved.

2. All the variations which have yet been observed are *periodical*; that is, if, for example, the distance of a planet from the sun is now increasing, it will afterwards decrease, then again begin to increase, and so on. Even the acceleration of the moon's mean motion just alluded to, will in time be changed into a retardation. At one period the motion of Saturn is accelerated in a degree which depends upon the position of Jupiter; but then at another time it is as much retarded. We may add that, supposing the *mean* distances to be subject to very slight and slow periodical variations, it has been shown that they will never be all in their state of either increase or decrease at the same time; but that some must be increasing while others are decreasing.

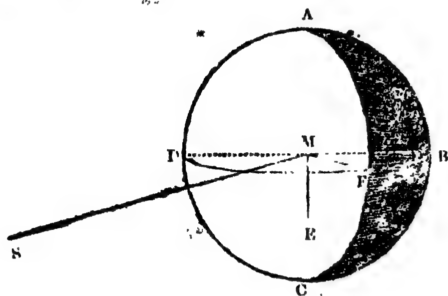
Whenever we talk of a motion as uniform, which is not really uniform, it is to be understood that, *with regard to the matter then immediately under consideration*, the want of uniformity makes no sensible difference in the *nature* of the result. Thus, when we come to speak of the moon's phases, we shall be very well able to explain the progress from new to full moon, and back again, without taking account of the irregularity. These will only affect the time of the phenomenon, and not the phenomenon itself. However varied the motion round the earth may be, provided it does move round, there will always be a new and full moon.

If one ball, A, is luminous, and throws its light upon another, B, if A be less than B, less than half of B will be illuminated; if A be equal to B, just half of B will be illuminated; and if A be greater than B, more than half of B will be illuminated. This is evident in the following diagram. At the same time, however great the ball

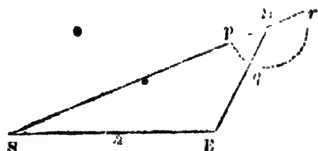


A may be, the further it is removed from B the less of B is illuminated; though if A be greater than B, never less than one half. Though the sun is much greater than the moon, yet its distance is so great that we may consider the moon as half illuminated.

In the following diagram, the eye of the spectator is looking at the moon from a point in the line M E, so that the hemisphere of the moon which is visible to him (or which would be, if completely illuminated,) is bounded by the circle A B C D. The line M S is drawn from the



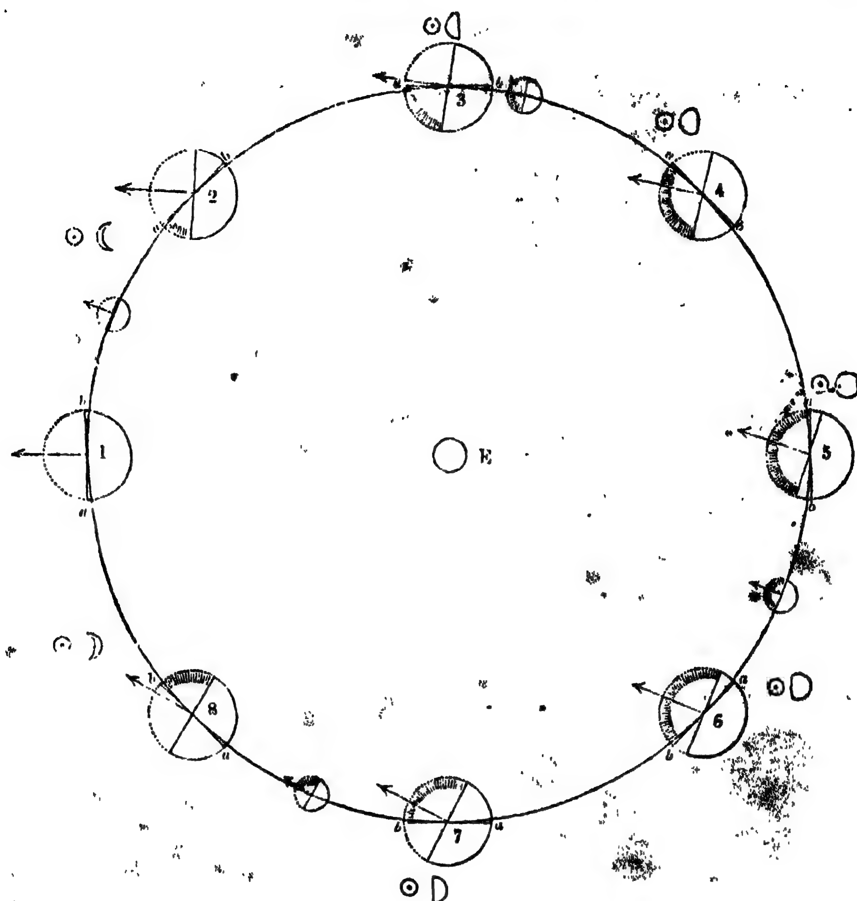
centre of the moon towards the sun, so that the boundary of the illuminated part, or as much of it as is seen from the earth, is A F C. Of the hemisphere, which would, if illuminated, be visible to him, A B C is not illuminated, and is therefore not visible, and A D C is visible. The size of the portion A B C depends upon the angle F M B, which is the same as the angle S M E, that is, the angle by which the sun is separated from the earth to a spectator at the centre of the moon; that is to say, the *dark* part of the moon is as great a proportion of the whole hemisphere as the angle under which a spectator at the centre of the moon sees the sun and earth, is of two right angles. Or more simply thus:



let S, E, and M represent the relative positions of the centres of the sun, earth, and moon, then drawing a semicircle pqr, pq represents the proportion of the moon's surface which is dark, and qr that which is enlightened. It must be observed, however, that the dark part is on the other side of the moon, not on that of pq; for on looking at the preceding figure we see that M E and M S both cut through the enlightened part of the moon. Inattention to this circumstance would make us place the dark and light parts on the wrong sides.

We now represent the real phenomena of a *lunation*, or period in which the moon goes through all its changes. We suppose the sun to move round the earth, instead of the earth round the sun, which will make no difference in the observed phenomena, as the reader will see on consulting the article on Relative Motion in numbers 43 and 44 of the Penny Magazine. A *sidereal* revolution (*sidus*, a star) of a heavenly body is the time in which it goes completely round the heavens, from a star to the same star again. The average or mean sidereal revolution of the sun, or the sidereal year, is 365 days, 6 hours, 9 minutes, and 10 seconds; the average or mean sidereal month, or revolution of the moon, is 27 days, 7 hours, 43 minutes, and 12 seconds. From which we may calculate, that while the moon moves round the heavens, the sun moves, on the average, through $26^{\circ}\frac{9}{10}$.

In the diagram in the following page, in which the sun, moon, and earth are supposed to be in the same plane (a supposition near enough to the truth for our purpose), we trace, not the common month, or *lunation*, but the *sidereal* month; which we do, partly because we suppose many of our readers have studied the common diagram in which the phases are explained, while the sun remains stationary, and partly that they may the better see how the common month, lunation, or *synodical* month, arises. The earth is at E; the sun is so distant that it appears in the same direction from the centres both of the earth and moon. This is not a forced supposition, for the proper place of the sun would be at a distance from E, equal to four hundred times the distance of the moon. While the moon moves round the circle 1, 2, 3, &c. the sun moves round E more slowly, and the arrow which passes through the moon in the figure points to the sun in each position of the moon. The smaller circles represent the moon's equator, the enlightened part of which is dotted; while the part of the enlightened disc which is *seen from the earth* has a thin line of shading behind the dots. The boundaries of the face presented to the earth are at *a* and *b*. The reader must imagine the representation of the moon to be very much reduced in size. We first suppose the moon and sun to be both in the line passing through E and 1. No part of the enlightened hemisphere is then visible: it is new moon, and there is an eclipse of the sun. The reason why there is not always an eclipse of the sun at new moon is, that our supposition is wrong, and the sun is generally a little above or below E 1. The moon moves from 1 to 2. If the sun moved as fast, no part of the enlightened face would ever become visible; but the revolution of the sun being much slower, a part of the western edge of the enlightened face becomes visible, producing the horned appearance visible in the young moon, the horns being turned away from the sun. At 3, it is nearly half moon; it would have been quite so, had the sun remained *still*; but, as it is, the half moon will take place a little further on, which we have represented on a smaller scale. At half moon, the boundary diameter of the enlightened hemisphere would pass through the earth, if lengthened. When the moon comes to 4, nearly three-quarters of it, but not quite, will be visible. At 5 it is not quite full moon; which latter phenomenon will not be observed until some time after, as in the smaller moon, which follows 5. Were our diagram strictly true, there would be no full moon, but an eclipse of the moon at that point, since the earth would prevent the sun's rays reaching the moon. The sun is, however, as before observed, generally a little above or below the plane of the paper. The phenomena of the positions 6, 7, and 8, will now be easily



seen; but on coming to 1 again it will not be new moon, since the sun will have moved forward, and the moon must overtake it, as represented in the smaller figure. From this period the same changes recommence. During the first half of the month the horned or unfinished side of the moon is that which is furthest from the sun: during the latter half the unfinished part is nearest the sun.

We see then that the common month or *synodical* month is the sidereal month added to the time during which the moon can overtake the sun. This adds more than two days to the sidereal month; in fact, we have

	D.	H.	M.	S.
Average sidereal month . .	27	7	43	12
„ synodical month . .	29	12	44	3

Nevertheless, we must not expect to find the real lunations of the Calendar in exact agreement with the average last given. In the first place, the motion of the moon is not perfectly uniform; neither is that of the sun. In the winter, the sun is nearer the earth than in summer, and moves more rapidly. The winter lunations will therefore be longer than those of the summer, since the moon having described her actual revolution must follow the sun through a greater angle. This cause alone makes three or four hours of difference.

There is a very good illustration of a synodical revolution in the hands of a watch. These are together at twelve o'clock, and would be together at one, if the hour-hand remained stationary; but in the mean while the hour-hand has moved through five minutes, and the minute-hand will therefore take something more than five minutes before it overtakes the hour-hand. We shall find exactly how much it must move through, because, changing the numbers, any one who understands arithmetic may then deduce the synodical month from the sidereal month. Whatever the hour-hand moves through, the minute-hand moves through *twelve* times as much, because it moves twelve times as fast; but before the minute-hand can overtake the other, it must go completely round, and move through what the other has moved through besides; therefore one complete round of the minute-hand is *eleven* times the motion of the hour-hand before it is overtaken. That is, 60 minutes is eleven times what we are in search of; which latter is therefore $5\frac{5}{11}$ minutes.

Having thus described the phenomena which the moon presents, we shall proceed in our next to give an account of a paper by M. Arago on the question of the moon's influence on the weather.

Curious Clock.—The most curious thing in the cathedral of Lubeck is a clock of singular construction, and very high antiquity. It is calculated to answer astronomical purposes, representing the places of the sun and moon in the ecliptic, the moon's age, a perpetual almanac, and many other contrivances. The clock, as an inscription sets forth, was placed in the church upon Candlemas-day in 1405. Over the face of it appears an image of our Saviour, and on either side of the image are folding doors, so constructed as to fly open every day when the clock strikes twelve. At this hour, a set of figures representing the twelve apostles come out from the door on the left hand of the image, and pass by in review before it, each figure making its obeisance by bowing as it passes that of our Saviour, and afterwards entering the door on the right hand. When the procession terminates, the doors close.—*Clarke's Travels in Scandinavia.*

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

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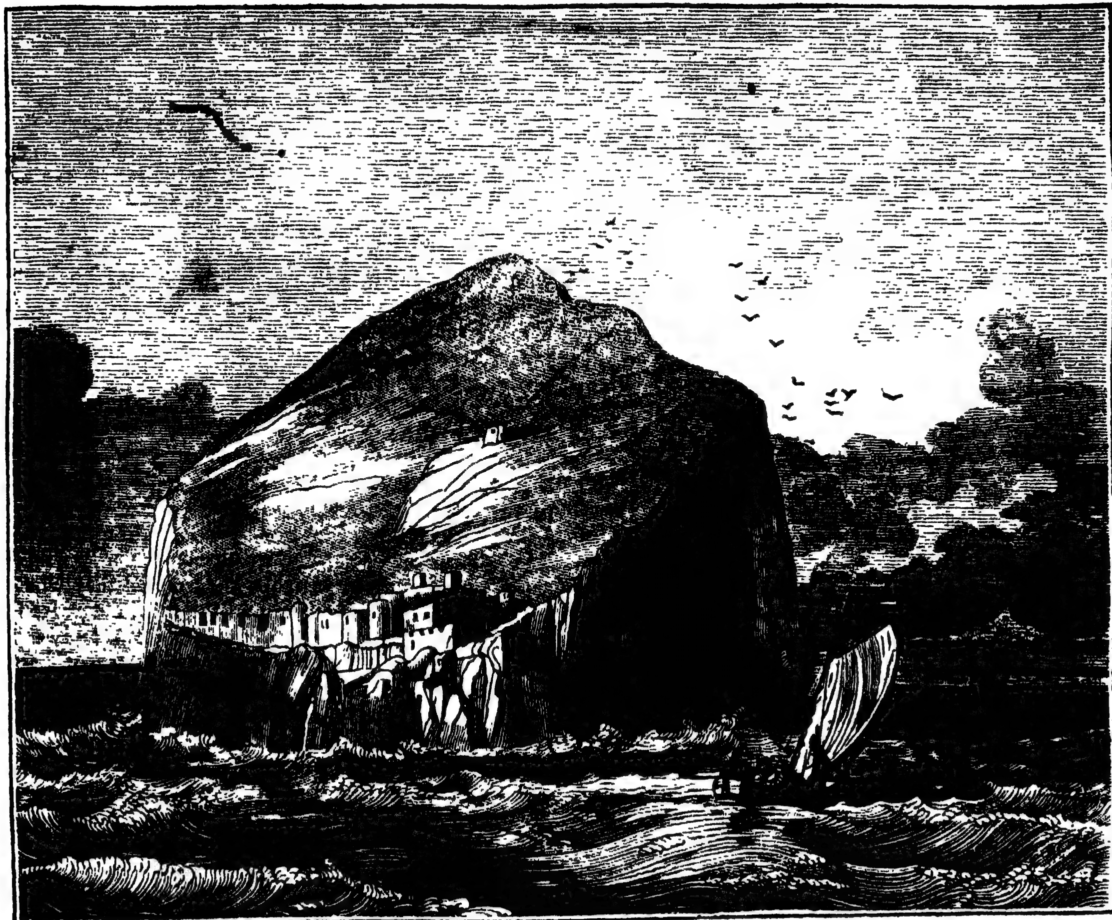
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82.] PUBLISHED EVERY SATURDAY. [JULY 13, 1833.

THE BASS ROCK.



[View of the Bass Rock.]

> "The fierce Dane,
> Upon the eastern coast of Lothian landed,
> Near to that place where the sea-rock immense,
> Amazing Bass, looks o'er a fertile land."
> HOME'S DOUGLAS.

ONE of the first objects that strikes the eye of the traveller, after he has crossed the Scottish border by Berwick, is this remarkable rock in the sea, which lies at the mouth of the Frith of Forth, at the distance of about a mile and a half from the coast of East Lothian. It continues to be seen during the rest of the journey, until the traveller approaches Haddington, when the mountain called Berwick-law, and other high grounds, conceal it from view. It is about a mile in circumference, and not much more than 400 feet above the level of the sea, but looks considerably higher. The water that washes its precipitous sides is from 30 to 40 fathoms deep. The rock can be approached in safety only in fine weather; and its stark, rugged cliffs are only accessible by one narrow passage that faces the main land. Close by this only landing-place is a castle, now in ruins, but once a place of great strength and some importance in history, consisting of four square towers and connecting works. During the war of religion between Charles II. and the Covenanters this castle was converted into a state-prison, and became the solitary residence of many west-country Whigs and recusants. When the dynasty of the Stewarts was driven from the throne of the United Kingdom, the Bass Rock was occupied by a brave garrison devoted to that ill-fated family, who obstinately defended it for several years, and gained for the place the dubious honour of its being the last spot of British ground to yield to the improved and more constitutional government introduced by the revolution of 1688. Besides the castle there seems once to have been a hermitage and some other habitations on this rock; but soldiers, monks, prisoners, and peasants have all been long gone; and now the only inhabitants of the Bass are immense flocks of Solan geese and some score of sheep, that contrive to climb up its precipitous sides and find pasture on its summit.

The base of the rock is perforated completely through from east to west by a natural cavern fearfully dark in the centre, and through which the sea frequently dashes and roars with astounding violence, but which may be examined at low water on a calm day. When the tide is out, the water remaining in this curious fissure, at a few yards from its mouth, is not more than knee-deep. The young fishermen often go through it though its aspect is exceedingly terrific. At one of the entrance

to this cavern it appears as if the Bass were composed of two immense rocks, the larger of which leans diagonally against the smaller, leaving this narrow chasm between them at the bottom, but closely joining with each other at all other points. There are several other caverns of considerable length, the openings into which resemble fretted Gothic windows or doors that have been made to deviate from the perpendicular by time or violence. The pencil of an able artist alone could convey an idea of their singularity and beauty.

The Bass is now the property of the family of the Dalrymples, of North Berwick, a little fishing-town on the coast, about three miles distant from the rock. It is of course more picturesque than profitable: about £30 per annum are paid for the birds, and £10 for the right of pasturage. The island pays annually twelve Solan geese to the minister, and two to the schoolmaster of North Berwick, as part of their stipends. These geese, the principal inhabitants of the islet, are white birds, considerably smaller than the domesticated geese. They differ in many points from any other species of wild geese. They are birds of passage, and so very particular in the choice of their residence, that it is said, that of all the lonely rocks and islets of Scotland they are only found here and on Ailsa Craig, a rock in the Frith of Clyde, very like the Bass. They regularly arrive, year after year, at the end of February or beginning of March. At first a small flight is seen to wheel round the rock, and then alight on its precipitous sides with the most clamorous screams; these are soon followed by other flights, each more numerous than that which preceded it, and in a very few days after the arrival of the scouts and vanguard, the whole of the migratory colony is assembled, and no more stragglers are seen to arrive. They generally leave the Bass in parties, as they came, towards the end of October, though, occasionally, when the winter is mild and fish abundant in the surrounding sea, they forego their journey to distant parts of the world, and stay there the whole year round. Last winter, for instance, they did not leave the Bass.

They lay several eggs each, but only sit upon one, which they hatch on the face of the bare rock. Their season of incubation is in June and July, when the cliffs literally seem covered with their snow-white plumage.

Their flesh has a strong fishy disagreeable flavour. A curious method is used by the fishermen in the neighbourhood to catch them: they take a small wooden plank, which is sunk a little below the surface of the sea by means of a stone or a piece of lead; on this plank they put a herring, and then drag the plank after them by a long rope, which leaves the trap considerably astern of the boat. The bird, attracted by the sight of its favourite food, wheels two or three times in the air, and then plunges down with such rapidity, that it often transfixes the plank with its bill, and is almost invariably stunned or killed by the shock.

The plumage of the Solan geese, which is beautifully white and soft, is sold to upholsterers and others, who employ it in making feather-beds. The old man, who rents the rock, plucks the birds before they are sent to market. When deprived of their plumage they sell on an average at about seven-pence each. A good many of them find their way to the markets of Dunbar, Haddington, and Edinburgh, where many persons, who have been accustomed to it, do not find their flesh unpalatable, and use it at breakfast. The old man only takes the young birds, but sportsmen and others, who occasionally disregard his rights, shoot whatever comes in their way, though it is scarcely possible to eat the flesh of the old birds.

The writer of this short account, who has just returned from an excursion to the Bass *, was much amused by the old fisherman's description of the mode of taking the young birds. It is precisely the same as that adopted in the Feroe Islands, Norway, and other rocky coasts. The geese hatch and bring up their young on the most precipitous sides of the rocks, where man has no possible means of access, except by being suspended from the head of the precipice. When this dangerous operation is to be performed, a party, never less than six men, climb up the Bass to some spot where there is firm footing, and which is immediately above a brood of the geese, which always lie in large flocks crowded together. The man who is to descend is secured by a strong rope tied round his body, and a second rope, with a leaden weight at its end, is dropped down by his side within reach of his hand. Both these ropes are kept fast by the men on the top of the rock, who gradually lower their companion down the sides of the perpendicular cliff. The man, in his descent, aids himself, or rests himself occasionally, by putting his toes in the crannies or on slight projections of the rock. The second rope, which serves to steady him, he grasps with his left hand, and in his right hand he carries a strong stick to knock down the young birds, and keep off the old ones, whose bite is exceedingly severe. As soon as he reaches the point where the brood lies, he proceeds with all expedition to knock them on the head, on which they fall from the narrow ledge where they were sitting, and drop into the sea at the foot of the rock, where they are taken up by men in boats. Great havoc is thus made on the poor birds in a very few seconds, and when their destroyer has disposed of all he can reach, he is pulled up to the top of the rock.

* May 9, 1833.

The eastern side of the Bass is most frequented by the Solan geese. As the writer approached, on the morning of the 9th May, an almost incredible number of geese flew thence, looking like snow blown from a mountain's side. Their united scream, which is peculiarly wild and shrill, seemed to reproach his intrusion as they wheeled over his head. In going round the rock, the geese flew out in great numbers in many other places, and besides them morrits or puffens, and tommy-nories or hawks, darted from the sides of the cliffs in countless numbers.

When the writer reached the landing-place, he found some men in a large boat with twenty-two sheep that were brought to the Bass for pasture. The first part of the ascent, which lay over steep slippery rocks, was not performed without some difficulty either by the sheep or the men. On the top of the rock, however, the poor sheep found excellent grass. They were to be left here until October or November, when the shepherd said, it was sure they would be found fat and in the finest condition. A variety of beautiful wild flowers, in full bloom, sprung up among the pasture and from fissures in the rocks.

Many of the geese had already laid their eggs and were sitting on them. On the side of a cliff above the castle—the only place where the traveller could get at all near to them—about a hundred that were thus occupied, allowed him to approach almost within reach of them before they would leave their eggs. They then rose on the wing, uttering their wildest screams, and hovered over their eggs until the intruder departed, when they instantly returned to their positions. The eggs lay on the bare rock without any thing to protect them. Unlike the tame goose, these birds had a very bold and fierce appearance.

On the shore of the main land, immediately opposite to the Bass Castle, stand the striking ruins of Tantallan Castle, which form one of the finest features in the view, that is, on all sides, varied and picturesque, and crowded with historical associations.

On returning from the Bass, one of the boatmen picked up a full-grown Solan goose that had been wounded and lay on the water unable to rise. Though this bird was almost exhausted, and died an hour after it was taken, the strength of its bill and its fierceness were very remarkable. The bill terminated in a sharp point, slightly curved at the extremity; it was nearly twice as

long as the bill of the domesticated goose; its colour was a light grey, and it was marked on each side (both the upper and lower part of it) with a fine black line that merged at one end in the black mark round the eye, and at the other end terminated in an evanescent point near the end of the bill. The strength and regularity of these lines were very curious.

The top of the bird's head was of a delicate brownish yellow colour, very like raw Italian silk. This colour was softened off as it approached the bill; it was darkest at the back of the head at the beginning of the neck, but became fainter and fainter as it descended the neck, until it faded away, imperceptibly, in the spotless white of the plumage of the body. The end of the bird's wings were black. The web of its feet were a fine dark brown, with a tinge of blue; the tendons in them (four to each foot) were beautifully defined and beaded; in colour they were pale blue, with a very light tinge of green. The old fisherman said this was a fine specimen of the species, among which he had never been able to detect any variety. When first hatched the geese are of a dark brown colour all over. Nothing in nature, not even untrodden snow, can surpass the beautiful pure white of the plumage on the breast and body of the full-grown bird.

LIBERIA.

This colony, founded by a society in the United States in the Guinea district, eastwards of Cape Mesurado, is now in the twelfth year of its growth. None but free people of colour, or free men in general, whether white or black, are allowed to dwell within its limits; and hence the name that has been given to it. The chief town, which is fortified and inhabited by seven or eight hundred individuals, has been christened *Monrovia*, in honour of Monroe, the American President, during whose presidency it was founded. There is another town, called *Caldwell*, with a population of about six hundred souls and an "Agricultural Society," in this infant republic, which consists almost entirely of Africans, once slaves in the United States. In its earlier years, its existence was in great peril from the determined hostility of the neighbouring tribes; but their aggressions were courageously repulsed, and they have since evinced not only an aptness to adopt the customs and manners of their new neighbours; but many of them have actually placed themselves under the protection of the Liberian colony. Of its present state we cannot offer a more recent view than what is contained in a report published at Washington on the 27th September last, and reprinted in the 'Liberia Herald' of last February*; we give it just as it is, and without any comment:—"Having been requested by the free coloured people of Natchez to visit Liberia, and see for ourselves the true state of things, that we might make to them a correct and full report in regard to the prospects opening before free men of colour, who may settle in that colony, and having just returned from Africa, we present to our coloured brethren in the United States the following brief statement. On the 30th of June we anchored at Monrovia, and remained in the colony nearly three weeks, during all which time we were engaged in making inquiries and observations, and endeavoured to learn the true condition and prospects of the people. * * * When we arrived and set our foot on shore, we were treated with a kindness and hospitality far beyond our most sanguine expectations, and which made us feel ourselves at home. There was not a man who did not take us by the hand and treat us as brothers. We felt for the first time what it was to be free and independent. The people there possess a spirit of liberty and independence, such as we have never seen among the coloured people of this country. As a body, the people of Liberia, we think, owing to their circumstances, have risen in their style of living and their happiness far above those of their coloured brethren, even the most prosperous of them, that we have seen in the United States. They feel that they have a home. They have no fear of the white man, or the coloured man. They do not look up to others, but they are looked up to by them. Their laws grow out of themselves and are their own. They truly sit under their own vine and fig-tree, having none to molest and make them afraid. Since our return we have been in the houses of some of the most respectable men of colour in New York and Philadelphia, but we have seen none, on the whole, so well furnished as many of the houses in Monrovia. The floors are, in many cases, well carpeted, and all things about these dwellings appear neat, convenient, and comfortable. There are *five schools*, two of which we visited, and were much pleased with the teachers, and the improvement of the children. We noticed very particularly the *moral state of things*, and during our visit saw but one man who appeared to be intemperate, and but two who used any profane language. * * * The sabbath is very strictly observed, and there is great attention to the things of religion. We attended church several times, and one of us being a minister of the Gospel, of the Methodist Church, preached three times to large and very attentive congregations—all well dressed, and apparently respectable persons. We visited the poor-house, and found there four sick and infirm persons, one of whom made a good deal of complaint for want of supplies and attention. We found only two other persons in the colony who expressed any dissatisfaction, and we had much reason to doubt whether they had any good cause for it. The soil at Caldwell and Millsburg is as fertile as we ever saw, and much like the land on the Mississippi. We saw growing upon it, pepper, corn, rice, sugar-cane, cassada, plantains, cotton, oranges, limes, coffee, peas, beans, sweet potatoes, water-melons, cucumbers, sousop, banana, and many other fruits and vegetables. We saw cattle, sheep, and goats; also swine and poultry in great abundance. Wherever we went the people seemed to enjoy good health; and a more healthy-looking people, particularly the children, we have not seen in the United States. * * * Our own health, whilst in the colony, was perfectly good, although we were much exposed to the night air. We must say, that had what we have seen of the prosperity of the colony of Liberia been reported to us by others, we should hardly have believed them; and are therefore prepared to expect that our own report may be discredited by our coloured brethren. We wish them to see and judge for themselves. Whatever they may say or think, it is our deliberate judgment that the free people of colour will greatly improve their character and condition, and become more happy and more useful by a removal to Liberia. There alone can the black man enjoy true freedom; and where that freedom is, shall be our country."

* This is the eleventh monthly number of the third volume. In the 'Marine List,' the names of seventeen vessels 'arrived,' and seventeen 'sailed,' are given, as the return of the movements in the port, from the 11th January to the 11th of February, 1833.

Cultivation of the Vine in the Tyrol.—Great quantities of Brixen wine are consumed at Brixen, Sterzing, Pruneken, and in the valley of the Inn: the vine is accordingly extensively cultivated,—and they find a means of doing this with much economy of land; for the vine is planted in wooden troughs or mangers, at intervals of about four yards; an arch is formed with twigs, across, from one to the other, and the vine therefore forms a bower above,—while the ground beneath produces grain of one kind or another: they have therefore a double crop from the land, with only the deduction of the first outlay. The effect of this manner of planting is singular, and certainly gives great richness to the landscape: but the thick foliage of the vines, preventing the access of the sun to the crops beneath, must be injurious to them. They no doubt find their advantage however, in the system they adopt, else they would discontinue it.—*Inglis's Tyrol.*

ABBEY-CHURCH OF BATH.



[West Front of Bath Abbey-Church.]

THE Abbey-Church of Bath, of the west front of which the above cut is a representation, has been sometimes called a cathedral; but it has no title to that appellation. It was, up to the time of the dissolution of the religious houses, merely the church of a monastery or convent; and it has never been a diocesan church. The first religious establishment which existed here was a nunnery founded in the year 676, by Osric, designated King of the Wiccii, one of the petty princes subordinate to the King of Wessex. The nunnery is said to have been destroyed by the Danes; but, in 775, the house was rebuilt by Offa, King of Mercia, who dedicated it to St. Peter, and placed in it a body of secular canons. They held possession till 970, when they were removed by King Edgar, and the institution converted into an abbey of Benedictine monks. After this, the church was more than once destroyed and rebuilt. The fabric, which immediately preceded the present, was erected about the middle of the twelfth century. Its dimensions would appear to have exceeded those of the present church, its length having been about three hundred feet. In course of time it was allowed to fall into great decay, and was in part little better than a mere ruin, when Dr. Oliver King was appointed to the see of Bath and Wells in 1495. This prelate is stated to have been prompted to undertake the rebuilding of the abbey-church by a dream in which he beheld a ladder reaching from earth to heaven, and angels ascending and descending, as in the vision of Jacob, together with certain other emblems, which persuaded him that he was designed to be the restorer of the sacred structure. As this dream is actually represented on the west front of the church, there seems to be no reason to doubt the common story. King, although a man of ability and learning, seems to have been a character very likely to be influenced by a remarkable dream, or any other similar incident. His own name, compounded of the term King, and the Olive, which is recorded in the scriptural parallel to have been on one occasion chosen for their king by the other trees, is related to have been also regarded by him as

marking him out for this or some other important achievement. Of the truth of this tradition also some evidence is afforded by the sculptures of the abbey-church. Bishop King was zealously seconded in his pious undertaking by the prior of the monastery, William Birde, a person of a character apparently somewhat akin to his own. Birde has recorded his share in the work by leaving a W, with the figure of a bird, cut out on different parts of the church. Anthony Wood says, that he was one of the seekers after the philosopher's stone, and his researches appear to have been attended with the common result; for he is stated to have died poor and blind. His death took place in 1525, at which time the building of the new church had not advanced very far. It was, however, carried on by his successor, William Holway or Gibbes, and had been nearly brought to a close, when this last ruler of the monastery was obliged to surrender the house into the hands of the king in 1539.

After the Reformation the nearly-completed church was stripped of its glass, iron, bells, and lead, which were purchased from the royal commissioners by some merchants. The weight of lead alone is said to have amounted to four hundred and eighty tons. Its bare walls, with the other monastic buildings, and the ground on which they stood, were then purchased by a person of the name of Humphrey Colles, and he some years after sold the property to Matthew Colthurst. The son of the latter made a present of the church to the mayor and citizens, that it might serve, as it has since done, for a parish church. As for the other buildings, they passed through various hands, and were pulled down one after the other to supply materials, or to make room for other structures. "The buildings of the monastery," says the account of the abbey-church, published by the Society of Antiquaries, "extended over a large space of ground; they consisted of the church, cloisters, chapter-house, prior's house, monks' lodgings, and dormitory built by Bishop Bekington. The prior's house, with some of the apartments of the monks, stood on the south side of the conventual church. Soon after the dissolution, it was repaired, and again made habitable; some parts, however, of the old house were left in their pristine state, and were never occupied after their being taken from the monks. On pulling down part of these buildings in the beginning of the 18th century, one of the apartments, which had been walled up, and never explored, discovered a very curious and interesting sight: round the walls, upon pegs, were hung copes, albs, chesibles, and other garments of the religious, which, on the admission of the air, became so rotten as to crumble into powder. There was also found the handle of a crozier, and on the floor lay two large chests, without any contents, as it was alleged by the workman; one of whom, however, grew rich upon the occasion, and retired from business." The last traces of the monastic buildings at length disappeared in 1755, when their very foundations were removed. On this occasion many stone coffins were dug up, and the old Roman baths, which had been buried for probably more than a thousand years, were again brought to light.

It was some time after the church came into the possession of the city before any thing was done for its restoration. The first repairs were commenced in 1572 by a private citizen, Mr. Peter Chapman. They were carried on by the contributions of different individuals throughout the remainder of the reign of Elizabeth; and were not completed till about the year 1616. One of the most munificent contributors to the work, in its latter stage, was the bishop, Dr. James Montague, who came to the see in 1609. His brother, Sir Henry Montague, Chief Justice of the King's Bench, and Sir Nicholas Salters, a citizen of London, also contributed with great liberality.

From this sketch it appears that the present abbey-church of Bath is to be referred to the very latest age of what is called the Gothic style of architecture. It is in fact the last great building in that style which was erected in this country. It is far from having to boast of either the magnificence or the richness of many of our cathedrals; but it is still a fine and imposing building. "This church," says Fuller, in his quaint manner, "is both spacious and specious, the most lightsome as ever I beheld, proceeding from the greatness of the windows, and whiteness of the glass therein." From this abundance of light the church was wont to be called the Lantern of England. The windows amount in all to fifty-two, and some of them are of very large dimensions.

The form of the church is that of a cross, surmounted by a tower at the meeting of the nave and transept. The length from east to west is 210 feet, by 72 in breadth, and 78 in height. The length of the transept is 126 feet, and the height of the great tower 152. Mr. Britton, in his History of the Church (4to. 1825), observes that the building is remarkable for the unusual width of the aisles of the nave, the narrowness of the transept, and the length of the choir. The tower, also, instead of being, as usual, a square, is an oblong, the east and west sides of the base being about a fourth longer than the north and south.

The west front presents, as usual, the most elaborate architectural display, and its aspect is one of considerable magnificence. Over the great central door is a broad and lofty-arched window, while battlemented octagonal towers rise from the two extremities of the façade. Buttresses and ornamental sculpture cover the spaces between, producing a rich and bold effect.

The window in the east end is also of large dimensions, and forms one of the finest ornaments of the building. It is remarkable for the peculiarity, in a Gothic edifice, of being terminated at the top, not by an arch, but by a straight line. The interior of the church has none of the "dim religious light" which fills our greater cathedrals. It presents, on the contrary, an appearance that may be almost described as gay and showy. Twelve clustered pillars divide each aisle from the nave, which are joined overhead by cylindrical arches, and support a roof remarkable for its symmetry and beauty. The monuments are so numerous as to form quite a throng; and the walls and pillars are besides covered with tablets of every variety of shape and material. One of the most striking of the monuments is that of Bishop Montague, which is in the form of an altar, exhibiting the reclining figure of the bishop in his pontifical robes. The use to which this church has been put as a parish church has necessarily changed much of its original appearance and character. Pews and galleries, in the modern style, occupy a large portion of the space which was left empty in the original design, and altogether destroy its proper simplicity and grandeur.

Unfortunately for the external appearance of the abbey-church, it is, like too many of our finest ecclesiastical edifices, surrounded and encumbered by various extraneous buildings, which make it impossible to obtain a complete view of it from the immediate vicinity. Many houses, indeed, had been allowed to be actually run up against the walls of the church; but most of these have recently been taken down, and the rest are now in the course of removal. So great, however, is the accumulation of earth and rubbish around the building, that the level of the ground without is several feet higher than the floor of the church, to which accordingly there is a descent of three steps from the door. But although its lower portion is thus buried and hidden, it is still, from its size and elevation, a most conspicuous object from every part of the surrounding country, and, looked down upon from any of the heights that encompass the rich vale of the Avon in which Bath stands, forms the most prominent architectural feature of that superb and beautiful city.

THE MOON.—No. 3.

WHEN one phenomenon is observed constantly to happen at or near the same time as another, the most sceptical mind is convinced that there must be some connexion between the two. It does not follow that the second is caused by the first: but if not, the necessary alternative is, that both must depend upon or in some way be derived from the same cause. And every circumstance which in any ways adds a new and constant relation is so much additional proof of the connexion. However extraordinary or unaccountable it may be that two phenomena should always happen together, the mere fact of their so happening is an argument in proof of their connexion, which it is impossible to overturn by any reasoning whatever.

Nothing is more common than to hear the evidence of such connexion opposed by arguments which after all amount to this—that the speaker does not see any way of explaining *how* the connexion exists. And still more common is it to maintain the existence of a connexion for which there is no evidence, because it is not *more* extraordinary than something else for which there *is* evidence. A philosophical mind will not allow the word *extraordinary* to have any place in its vocabulary of words employed in reasoning, but will stand prepared to admit that any two phenomena whatsoever, which constantly occur together, are in some manner related to one another.

The determination becomes more difficult when the two phenomena do not occur constantly together, but only more or less frequently. In such a case the only method is to examine a large number of observations, with a view of finding whether there is any particular circumstance hitherto neglected, which distinguishes the cases in which the phenomena have occurred together, from those in which one has happened unaccompanied by the other. For example, the attention of astronomers has lately been very much turned to the observation of eclipses of stars by the moon, or, as they are called, *occultations*. The subject was taken up as affording a useful method of finding the longitude, but several persons soon observed that frequently, when the moon approached the star, instead of hiding it instantaneously, the effect is for a second just that which might be expected if the *star* were the nearer body of the two: that is, the star appears to move *forward upon the moon's disk*, or to be *projected* upon it for a very small time, after which it disappears. Remarkable as this may appear, it is still more worthy of notice, that it is not every observer who is gifted with the power of seeing this phenomenon,—that some stars are almost always, others hardly ever, projected,—that some observers see the projection at some occultations of a star, but not at other occultations of the same. About five years ago the Astronomical Society called the particular attention of observers to these circumstances, and they thereby procured a mass of information, which is published at the end of the fourth volume of their Memoirs. Amongst other occultations, that of Aldebaran was observed, which took place on October 15, 1829. Thirty-one different observers sent accounts of what they saw, variously distributed in England, France, and Germany. Of these, twenty-three agree in stating that they saw the star visibly projected on the moon's limb, some more and some less, but mostly from two to three seconds. The other eight saw nothing of the kind.

We see then that in this particular case nothing can be done until a great multitude of observations shall furnish the means of ascertaining whether this phenomenon is in the eye of the observer, in his telescope, in the surrounding atmosphere, or whether it really arises out of any circumstance connected with the moon itself.

When two phenomena are suspected to have some connexion with one another, nothing but a large number of observations can be of use in ascertaining whether or no the suspicion is well founded. Let us suppose, for example, that a die of six faces is suspected to be very slightly loaded on the side of the ace; from which, if true, it will follow that in a large number of successive throws, the ace will appear more than its fair proportion of times. Since there are six throws, all of which, on a fair die, are equally probable, we must expect that out of a *large* number of throws, one-sixth *nearly* will be aces. No small number of throws will enable us to form a fair conclusion; and we must not of course expect exactly one-sixth to be aces, or even *very* nearly one-sixth. Suppose, for example, that six thousand throws have been made and registered, of which we might therefore expect one thousand to be aces. We find, however, that there are eleven hundred aces, more than the expected proportion, but not so much more as to justify us in coming to a conclusion. But if we now examine each thousand throws by itself, and find that each of them has more than its proportion of aces, we have very strong grounds for suspecting that there is some reason for the appearance of the ace, of which we were not aware when we said that all throws were equally probable. And if instead of into thousands we divided the throws into five hundreds, and found still that each lot contained more than its proportion of aces, we should have *moral certainty*, that is, a probability of a very high order, that the die was loaded in some way.

The general principle on which the preceding reasoning is founded is, that if in a very large number of observations we perceive a constant tendency to the happening of some event more often than from our previous knowledge of the circumstances we thought it fair to expect, and if upon repeating our observations, or looking at the several lots of observations of which our large number was composed, we still find the same result, we must conclude that there is more reason for the happening of that event than we were aware of.

We now proceed to give the contents of the paper by M. Arago on the connexion of the moon with the state of the weather.

The lunar month of twenty-nine days and a half is, as is well known, divided into four quarters, each, on the average, of 7⅜ days. The first quarter lies between the new and half moon: the second between the half and full moon: and during these two quarters the moon is increasing. The third and fourth quarters, which include the whole wane of the moon, are from full to half moon, and from half to new moon, respectively.

In 1830 M. Schübler, of Tubingen, published a series of observations on the weather, made in twenty-eight different years, viz.: at Munich from 1781 to 1788; at Stuttgard from 1809 to 1812; and at Augsbourg from 1813 to 1828, all inclusive. The following table gives the number of rainy days in each quarter for a part of that period.

	1809 to 1812.	1813 to 1816.	1817 to 1820.	1821 to 1824.	1825 to 1828.	On the whole.
First quarter . . .	132	142	145	179	166	764
Second do.	145	169	173	180	178	815
Third do.	124	145	162	166	164	761
Fourth do.	110	139	135	153	159	696
First two quarters .	277	311	318	359	344	1609
Last two do. . .	234	284	297	319	323	1457
Difference . . .	43	27	21	40	21	152

This table, though constructed for short periods, not very likely to give good averages of all the changes, yet offers no exception to the following rule: that there are more rainy days in the second quarter of the moon than in any other, and fewer in the fourth. Also that the first half of the lunar month is more rainy than the second. Some old observations, made at Vienna in and about 1788, confirm the preceding results obtained at Augs-

bourg and Stuttgard. And it must be remarked, that the *quantities* of rain which fall in these three capitals are very different, for to every 43 inches of rain which fall at Vienna, there are 64 at Stuttgard, and 97 at Augsbourg.

Some results obtained at Montpellier about 1777, contradict the preceding conclusions. However, as M. Arago remarks, the experiments were there made through a shorter time, and no very distinct information was given, as to what was recognized as constituting a rainy day. In the results of M. Schübler, a day was called rainy in which the quantity of rain which fell amounted to more than two-hundredths of a line (the line being the twelfth part of a French inch). We may add that the Montpellier experiments are not presented broken up into smaller lots, so that we cannot compare the result of the whole series with that derived from its separate component parts. And it must be observed, that whatever probability may exist as to the quantity of rain being greater in one quarter of the moon than in others, the observations are yet too few to enable us to say whether there is any probability that it is the same quarter in all places.

M. Schübler then compares the number of rainy days which have happened at the different phases of the moon during twenty-eight years, in which there were 4299 rainy days. From which he finds the following result, that out of 10,000 rainy days the following was the number which happened at each phase. The octant is the real *quarter, or three quarter* moon, that is, half way between new and half moon, or half and full moon, &c.

New moon	306	Full moon	337
First octant	308	Third octant	310
Half moon (increasing)	325	Half moon (waning)	284
Second octant	341	Fourth octant	290

The following table is made from sixteen years of observations at Augsbourg. By a clear day is meant one in which there were no clouds at seven in the morning, and at two and nine in the afternoon: by a cloudy day one in which the sky was clouded at all these periods. The quantity of rain is measured in lines, or twelfths of inches.

	Clear days.	Cloudy days.	Quantity of rain.
New moon	31	61	299
Half moon (increasing) . .	38	57	277
Second octant	25	65	301
Full moon	26	61	278
Half moon (waning) . . .	41	53	220

Which results agree in general indications with the preceding.

With regard to the distance of the moon from the earth, two observations have been made which confirm each other, by M. Schübler and M. Pilgram, the Vienna observer above-mentioned. From the former it appears that in twenty-eight years the week in the middle of which the moon was at her nearest distance to the earth gave 1169 rainy days; while the similar week for the furthest distance of the moon gave 1096 such days. The Vienna observations, out of 100 different months, gave 36 days of rain when the moon was nearest the earth, and 20 when the moon was furthest from it.

In some observations made in 1774, at Montpellier, it appeared that out of 760 rains, 646 began either when the moon was very near the upper or lower meridian, or very nearly rising or setting. This is however not a sufficient number of observations on which to ground even a surmise.

In sixteen years observations made by M. Schübler at Augsbourg, he found that south and west winds prevailed most from new moon to the middle of the second quarter, while north and east winds were most frequent during the last quarter.

We shall proceed with the details of M. Arago's paper in our next. We shall only observe, that while some will admit a higher, some a lower probability of the connexion between the moon and the weather, according to their various temperaments, all will see that nothing which has been said tends in any degree to confirm the common opinion, that change of weather takes place *at* or *very near* the change of the moon. All the observers must have been aware of this common opinion, which is older than the Christian era; so that had any thing approaching to a verification of it occurred, they would certainly have noticed it.

DOMESTIC IMPROVIDENCE.

The following extracts, from the evidence taken by the Poor-Law Commissioners, are deserving of the most serious attention from all those who are anxious to make their incomes, whatever be their amount, obtain for them a full value in exchange for commodities. Working people are very deficient in that knowledge which makes a slender purse often more available for comfort than a well-filled one improperly managed.

Mr. Okedon reports, from a parish in Dorsetshire, the following curious example of the improvidence of the poor in their common dealings:—

"The enormous profits of the shopkeepers, and the badness of their articles, induced one of the landowners here to furnish a shop with goods (tea, sugar, rice, treacle, &c.) of excellent quality, which were supplied to the poor at prime cost. A better tea than they used to get for 6s. 10d. per lb. was supplied at 5s. 8d. per lb., and every thing else in proportion. The two shopkeepers, who formerly made a livelihood by their trade, were pensioned off. Ready-money (that is, one week's credit) was required. In one year the old shopkeepers threw up their pensions, and returned to their trades, and *all* their customers followed them. The fact is, long credit is given; and one of the shopkeepers confessed to me, that if one out of three paid, he made a very comfortable profit. So that the fashionable coachmaker in Long-acre, and the petty huckster of a petty village, proceed on the same principle of dealing."

Mr. Mott, the contractor for Lambeth Workhouse, a most intelligent witness, gives highly valuable evidence on the subject of pawning:—

"In the course of my experience and investigation, I have had many thousands of duplicates of articles pledged by the poor; and I have found that nearly all the articles pledged by these classes are at sums from 3*d*. to 1*s*., and not exceeding 1*s*. 6*d*. each pledge. It is notorious to those acquainted with the habits of the people, and it is indeed admitted by the paupers themselves, that nine out of ten of them are pledged for liquor. The immense proportion of these pawnings were by women, and chiefly of articles usually deemed essential to their use or comfort, such as handkerchiefs, flannel petticoats, shifts, or household articles, such as tea-kettles, flat-irons, and such things: these articles being always in requisition, they are usually redeemed in a few days, and very frequently the same day. I made a calculation of the interest paid by them for their trifling loans, and found it to be as follows:

	Per Cent.		Per Cent.
A loan of 3*d*. { if redeemed same day, pays interest at the rate of . . }	5200,	Weekly	866
4*d*.	3900	„	650
6*d*.	2600	„	433
9*d*.	1733	„	288
1*s*.	1300	„	216

Mr. Chadwick has a valuable note, on the same subject, of the improvidence of the poor in their dealings:—

"On inquiry into the modes of life of the labouring classes, I found some of them, with comparatively high wages, living in wretchedness; whilst others, with less wages, live in respectability and comfort. The effect of economy is more strikingly marked on comparing the condition of persons of other classes, such, for instance, as merchants' or lawyers' clerks, with salaries of £50 or £60 a year, with the condition of mechanics earning from 30*s*. to 40*s*. a week. The one will be comparatively

well lodged, well fed, and respectable in appearance; whilst the other lives in a hovel, is badly clothed, and in appearance, as well as in reality, squalid and miserable. Many instances occur where a clergyman, or an officer on half-pay, maintains a family on less than £100 per annum; mechanics who during nine months in the year earn from 50*s.* to £3 a week in the metropolis, are frequently in the workhouse, with their families, during the winter months. In the course of my inquiries as to the condition of the working classes, a grocer residing in the metropolis, in a neighbourhood chiefly inhabited by the lower class of labourers, observed, that they are the worst domestic economists, and that if they had the intelligence, they have the means of greatly raising their own condition. He stated to me, that the working men habitually purchase of him the smallest quantities of the commodities they want. They come every day, for example, for a quarter of an ounce of tea for breakfast. This they do though in regular employment, and receiving their wages weekly. To estimate their loss on this mode of purchasing, he pointed out, that in a pound of tea they have to pay him, first for the labour of weighing sixty-four quantities instead of one. To this loss might be added their own loss of time in running to and fro sixty-four times to the shop instead of *once*. Secondly, for the additional quantity of paper used in wrapping up the tea. The paper which will wrap up a pound of tea will only wrap up sixteen quarter-ounces; consequently the purchaser of sixty-four quarter-ounces must pay extra for the wrappers of forty-eight quarter-ounces. Altogether, he considers that the labouring man pays not less than 6*d.* a pound, or the value of a pound or pound and-a-half of meat extra, for every pound of the low-priced tea he purchases. Nor is this the only loss. He is accustomed to consume the whole quantity purchased, though a less quantity might often suffice; all goes into the pot, as he will not leave, or, as he calls it, 'waste,' so small a quantity. And so it is with all other commodities."

COLUMBUS AND THE EGG.



Pedro Gonzalez de Mendoza, the Grand Cardinal of Spain, invited Columbus to a banquet, where he assigned him the most honourable place at table, and had him served with the ceremonies which, in those punctilious times, were observed towards sovereigns. At this repast is said to have occurred the well-known anecdote of the egg. A shallow courtier present, impatient of the honours paid to Columbus, and meanly jealous of him as a foreigner, abruptly asked him whether he thought that, in case he had not discovered the Indies, there were not other men who would have been capable of the enterprise. To this Columbus made no immediate reply, but, taking an egg, invited the company to make it stand upon one end. Every one attempted it, but in vain, whereupon he struck it upon the table so as to break the end, and left it standing on the broken part; illustrating, in this simple manner, that when he had once shown the way to the New World, nothing was easier than to follow it. This anecdote rests on the authority of the Italian historian Benzoni. It has been condemned as trivial, but the simplicity of the reproof constituted its severity, and was characteristic of the practical sagacity of Columbus. The universal popularity of the anecdote is a proof of its merit.—*Washington Irving's Life of Columbus.*

Our celebrated Hogarth published an etching, illustrative of this anecdote. We give a copy of it above.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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CASTALIA.



[View of the Castalian Fountain.]

Mount Parnassus, the city of Delphi, and the Castalian fountain are among the objects which ancient poetry has most delighted to consecrate.

As the abode of the Muses and Graces, as the shrine of Apollo, and the seat of the most famous of all oracles, as the source of poetical inspiration, the mountain, the city, and the stream, were endowed with all the charms that the fertile imagination of the susceptible Greeks could conceive. The poets of Rome, who were in most particulars followers of those of Greece, continued the same homage and fervent adoration; and even now, when Greek polytheism has given way to the Christian faith, this spot still retains something of its wonted influence. The bard still invokes the Muses from the sacred hill, honours the long deserted shrine of Apollo, and prays for the inspiring draughts of the Castalian fountain.

Unlike many other parts of Greece to which poetry and a most poetical superstition attached themselves, this peculiar district does not disappoint the expectation of those who have read the most glowing descriptions of it left to us by the ancients. To this fact Mr. H. Raikes, who has published a tour through Bœotia and Phocis, in Mr. Walpole's Memoirs relating to European and Asiatic Turkey, Sir John Cam Hobhouse, Lord Byron, and nearly every other explorer of Greece have borne testimony.

Parnassus rises in Phocis and extends as a chain of mountains far to the north; at its southern extremity it terminates in a lofty mass, or two partially detached masses of rock. This was the portion that more exclusively claimed the honours of the sacred mount. In the chasm between the two rocks is the source of the Castalia, whose sparkling waters descend through the gloomy abyss. Beneath these dissevered masses on a shelving platform, surrounded on three sides by precipices, once stood the city of Delphi, enriched by the most numerous and inestimable treasures of ancient art, though now nothing exists there but a wretched village called Castri.

The chasm through which descend the "Castalian dews" is thus described by Sir John Hobhouse: "From this spot (Castri) we descended gradually towards the east, and leaving the town, in half a quarter of a mile found ourselves in a position, where, turning suddenly to our left, we saw an immense cleft rending the mountain from the clouds down to our feet. Down the crags of this chasm, the stream trickled into a stone basin sunk in the earth just above the path, overflowing whose margin, and enlarged in its progress by other rills, it was seen falling over the rocks into the valley beneath." We may add, that after its descent into the valley, the Castalian waters presently flow into the rocky bed of the Pleistus and augment that river.

Close to the stone basin sunk in the earth there is an excavation, like a bath, cut in the rock; and in the face of the precipice, just above this excavation, is a large niche made anciently for the receptacle of some votive offering, "which," says Mr. Hughes, "has been turned into a Lilliputian chapel dedicated to Saint John, and adorned with an altar, before which a lamp is constantly kept burning."

Sir John Hobhouse found within this chapel part of the shaft of a large fluted pillar of marble and a marble slab. A few other ancient fragments and half-defaced inscriptions lay scattered and neglected in the vicinity of the basin.

Ascending the chasm by the side of the falling rivulet, which the traveller can do by means of grooves cut in the rock, though they are now almost obliterated by the continual dripping of the water, he is pretty sure to scare away a number of majestic eagles who have their airies on the lofty precipices above his head, and after clambering about one hundred yards, counting from the Chapel of Saint John, he reaches the origin of the stream. The Castalian fount is small indeed, but its waters are sparkling and as clear as crystal, and to the taste, pure, light, and delicious.

"On the rocks of Delphi" (above the Castalia), says Doctor Sibthorpe, "I observed some curious plants; a new species of Daphne, which I have called Daphne Castaliensis, afforded me singular pleasure. Several birds, the Aves rupestres, inhabited these rocks; a species of Sitta different from the Europea, the Promethean vulture, the solitary sparrow, the sand-martin, the rock-pigeon, a small species of hawk, and numerous jackdaws."

From the summit of Parnassus, high above the fount of Castalia, Dr. Sibthorpe* informs us he commanded "a most extensive view of the sea of Corinth, the mountains of the Morea on the one hand, and the fertile plains of Bœotia on the other, of Attica, and the island of Eubœa." We do not find the elevation of the mountain any where accurately mentioned; it is roughly given in several books at 8000 or 9000 feet. The distinguished naturalist from whom we have last quoted, informs us that among the numerous curious plants he collected on the mountain, few could strictly be called Alpine; and that those of the highest region of all could be regarded only as sub-Alpine. Whilst he reposed on the mountain-top an eagle hovered over his head, and the Cornix graculus, the Cornish chough, flew frequent among the rocks.

At the foot of this terminating mass of the Parnassian mount, and round about Castri, there are still sufficient ruins, according to Dr. Clarke, by which to trace out the ancient Delphi. "There is enough, indeed, remaining," says this traveller, "to enable a skilful architect to form an accurate plan of *Delphi:* but it should be fitted to a model of Parnassus; for in the harmonious adjustment which was here conspicuous of the works of God and man, every stately edifice and majestic pile constructed by human labour were made to form a part of the awful features of the mountain; and from whatever quarter Delphi was approached a certain solemn impression of supernatural agency must have been excited, diffusing its influence over every object; so that the sanctity of the whole district became a saying throughout Greece, and "ALL PARNASSUS WAS ACCOUNTED HOLY."

Mr. Cockerell, the architect, has attempted on the spot to give with his pencil a restoration of the City of the Oracle as suggested by Dr. Clarke.

To say a few more words of Castalia, the more immediate subject of this short article, it is, like all the other sacred streams of Greece, sadly degraded. At the time of Dr. Sibthorpe's visit, the only use the modern Delphians, the inhabitants of Castri, made of it was to season their casks; some barrels and other rubbish served to choke up and interrupt its source; and when Mr. Hughes was there "instead of Muses and Graces he found only a set of coarse-featured Albanian girls washing dirty linen therein."

The place, however, will still be replete with interest to the informed and feeling mind:—

"Though here no more Apollo haunts his grot,
And thou, the Muses' seat, art now their grave,
Some gentle spirit still pervades the spot,
Sighs in the gale, keeps silence in the cave,
And glides with glassy foot o'er yon melodious wave*."

A detailed account of the Pythian games which were celebrated with all the magnificence of that age;—of the temple and oracle of Delphi, to which the ancient city owed its rise and vast importance;—of the delusions practised by the priesthood and their instruments on a credulous and easily-excited people, will be found in the imaginary travels of Anacharsis by Barthelemy, who has drawn up his description upon the authority of Pausanias, Plutarch, Strabo, and a variety of other ancient writers.

Of all the caverns and grottoes that penetrate the flanks of Parnassus in the neighbourhood of the oracular city, the Corycian, or the cave of the Nymphs, is by far the most beautiful. "The narrow and low entrance of this cave," says Mr. Raikes, "spread at once into a chamber three hundred and thirty feet long by nearly two hundred wide; the stalactites from the top hung in the most graceful forms the whole length of the roof, and fell, like drapery, down the sides. The depths of the folds were so vast, and the masses thus suspended in the air were so great, that the relief and fulness of these natural hangings were as complete as the fancy could have wished. They were not like concretions or encrustations, mere coverings of the rock; they were the gradual growth of ages, disposed in the most simple and majestic forms, and so rich and large, as to accord with the size and loftiness of the cavern. The stalagmites below and on the sides of the chamber were still more fantastic in their forms than the pendants above, and struck the eye with the fancied resemblance of vast human figures. At the end of this great vault a narrow passage leads down a wet slope of a rock; with some difficulty I went a considerable way on, until I came to a place where the descent grew very steep, and my light being nearly exhausted, it seemed best to return. * * * * The stalagmitic formations on the entrance of this second passage are wild as imagination can conceive, and of the most brilliant whiteness. It would not require a fancy, lively, like that of the ancient Greeks, to assign this beautiful grotto as a residence to the Nymphs. The stillness which reigns through it, only broken by the gentle sound of the water, which drops from the points of the stalactites, the dim light admitted by its narrow entrance, and reflected by the white ribs of the roof, with all the miraculous decorations of the interior, would impress the most insensible with feelings of awe, and

* Walpole's Memoirs on Turkey, where the notes are published from the original MSS. of Professor Sibthorpe, who did not live to complete and bring out his work, the fruit of long travel and patient investigation.

* Lord Byron, Childe Harold, canto 1, st. lxii.

lead him to attribute the influence of the scene to the presence of some supernatural being.

"An inscription, which still remains on a mass of rock, near the entrance, marks that the cavern has been dedicated to Pan and the Nymphs."

THE FALLS OF TROLHATTA, NEAR THE VILLAGE OF LILLA EDET, IN SWEDEN.

A CATARACT or fall of water in a river has always rendered navigation difficult, and, indeed, when the fall is at all considerable, altogether impracticable.

In the latter case we are not aware that the difficulty has been overcome in any other country than Sweden, and we proceed to describe the place where it occurs from the very interesting Travels of Sir Arthur de Capell Brooke *, who has attentively examined a considerable portion of the north of Europe.

"Lilla Edet is a small village, rendered highly picturesque by the falls of the Götha, which give, on a reduced scale, a representation of what is so magnificently enlarged at Trolhätta. Within a few miles of the latter, the small but beautiful lake Treunung burst upon our view through an amphitheatre of surrounding woods, in which the pleasing notes of the cuckoo for the first time struck our ear; and our little steeds pursuing their way with renewed vigour, in the evening we approached Tralhätta. On descending the hill we discerned, yet at some distance, the contention of its boiling waters, by their spray forming a thick cloud of mist, which floated above it tinged by the rays of the declining sun. Hastening forward with increased curiosity, we soon arrived, and hurrying to the spot with mixed feelings of astonishment and admiration surveyed the scene. The whole waters of the Götha tumble here with fearful roarings down steep declivities among the rocks below; the sides are surrounded by precipices rising to a great height, thinly clad with straggling pines. Before arriving at the cataracts, the river glides on smoothly, and clear as crystal; in its descent it forms four principal falls, the perpendicular height of which, taken together, is about one hundred and ten feet. They are seen perhaps to the best advantage at the distance of half a mile below, on the height near the river, where a bird's-eye view is obtained of the cataracts rushing headlong towards you enveloped in foam and spray. That the navigation of the river may not be obstructed, locks with sluices like those on navigable canals have been cut in the solid rock with incredible pain and labour, through which vessels are lowered to the level of the river below the falls, pursuing their course with ease, and affording a striking proof, that there are few obstacles, however great, that cannot be surmounted by the ingenuity and perseverance of man."

The locks, with sluices, mentioned by Sir A. Brooke, exist on what is really a canal, it being a passage cut through a solid rock of granite. It is two miles long and one hundred and fifty feet high. This difficult work, after many unsuccessful plans and attempts, was at length completed at the beginning of the present century by a private company. The year after its completion one thousand three hundred and eighty ships of various sizes, with cargoes of corn, herrings, iron, timber, &c. passed through this canal.

Method of pressing Oil in Corfu.—The manufacture of oil is the principal, and the machines employed in it are the rudest possible. The olives are pressed under a perpendicular stone wheel, which revolves in a large-sized horizontal stone of a circular form, somewhat hollowed in the centre. A horse or mule sets the machinery in motion, and a peasant runs before and shovels the olives under the approaching wheel, the action of which is necessarily confined to a limited space, while its power is very insignificant. The bruised mass is then transferred to a bag made of rushes or mat, which is subjected to a heavy pressure; this pressure is increased by means of a screw, wrought by two men at irregular intervals; for the labour is so violent that they cannot possibly continue long at it. They ship two strong bars, after the manner of a capstan, and then, with a most savage yell, they urge them forward by a simultaneous dart, the effect of which is marked by a quantity of oil oozing through the mat, and falling into a hole cut in the ground for its reception. After an interval of forty or fifty seconds, the labourers dart forward again with similar violence, and with a bodily effort which must strain their whole frame. The quantity of oil that two expert labourers can express in a day is estimated at ten or twelve jars of rather more than four gallons each.—*Hennen's Medical Topography of the Mediterranean.*

Letter of John Hunter.—Amongst his papers is a curious note to William Hunter from his brother John, which it may not be out of place to give here, as it illustrates one feature of the character of that extraordinary man.

DEAR BROTHER,

The bearer is very desirous of having your opinion. I do not know his case. He has no money, and you don't want any, so that you are well met.

Jermyn Street, Saturday.

Ever yours,
JOHN HUNTER.

—*Wardrop's Life of Dr. Baillie.*

THE HAMLET,

AN ODE: BY DR. WARTON.

THE hinds how blest, who ne'er beguiled
To quit their hamlet's hawthorn wild,
Nor haunt the crowd, nor tempt the main,
For splendid care, and guilty gain!

When morning's twilight-tinctured beam
Strikes their low thatch with slanting gleam,
They rove abroad in ether blue,
To dip the scythe in fragrant dew:
The sheaf to bind, the beech to fell,
That nodding shades a craggy dell.

Midst gloomy glades, in warbles clear,
Wild nature's sweetest notes they hear.
On green untrodden banks they view
The hyacinth's neglected hue:
In their lone haunts, and woodland rounds,
They spy the squirrel's airy bounds;
And startle from her ashen spray,
Across the glen, the screaming jay:
Each native charm their steps explore
Of Solitude's sequester'd store.

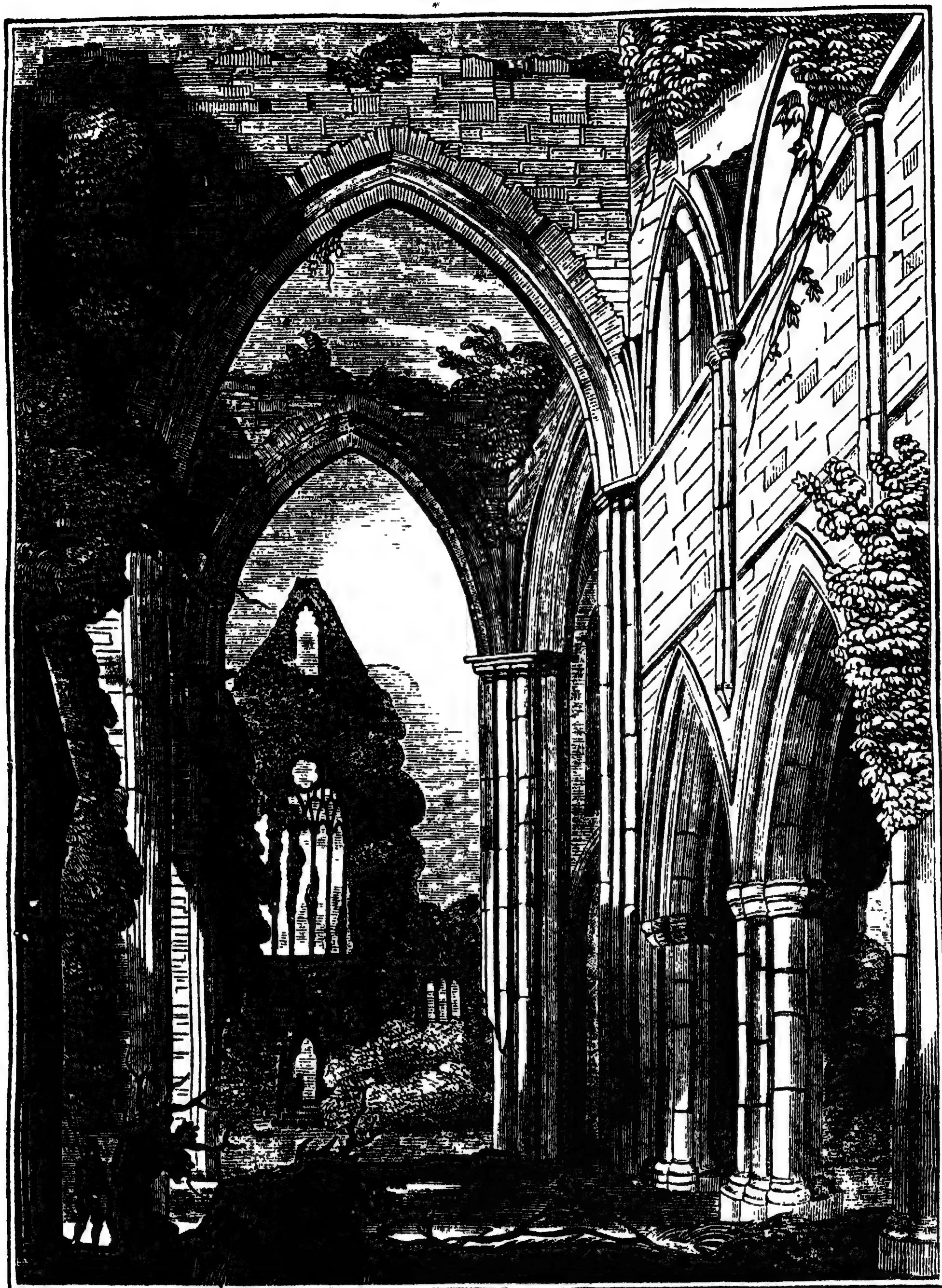
For them the moon with cloudless ray
Mounts, to illume their homeward way:
Their weary spirits to relieve,
The meadows incense breathe at eve.
No riot mars the simple fare,
That o'er a glimmering hearth they share:
But when the curfew's measured roar
Duly, the darkening valleys o'er,
Has echoed from the distant town,
They wish no beds of cygnet-down,
No trophied canopies, to close
Their drooping eyes in quick repose.

Their little sons, who spread the bloom
Of health around the clay-built room,
Or through the primrosed coppice stray,
Or gambol in the new-mown hay;
Or quaintly braid the cowslip-twine,
Or drive afield the tardy kine;
Or hasten from the sultry hill,
To loiter at the shady rill;
Or climb the tall pine's gloomy crest,
To rob the raven's ancient nest.

Their humble porch with honey'd flowers
The curling woodbine's shade embowers:
From the small garden's thymy mound
Their bees in busy swarms resound:
Nor fell Disease, before his time,
Hastes to consume life's golden prime:
But when their temples long have wore
The silver crown of tresses hoar;
As studious still calm peace to keep,
Beneath a flowery turf they sleep.

* Travels through Sweden, Norway, and Finmark, to the North Cape; 1 vol. 4to. 1831.

TINTERN ABBEY.



[View of Tintern Abbey.]

ONE of the most beautiful of our British rivers is the Wy or Wye, which, during a considerable part of its course, forms the boundary between Gloucestershire and Monmouthshire, and finally pours its waters into the estuary of the Severn. The banks of the Wye are for the most part steep and wooded to the water's edge; but where the high ground, as is occasionally the case, is removed to a little distance, low pastoral meadows occupy the interval, and finely relieve with their softer and more quiet beauty the hilly and dark-coloured landscape with which they are interspersed. In one of these sheltered vales, about nine miles south from Monmouth, and close to the water, on the right or western bank, stands the ruin of Tintern Abbey. This religious house was founded in 1131 by Walter de Clare, grandson of Walter Fitzosbert, Earl of Ew, by whom it was dedicated to the Virgin Mary. It was filled by a colony of Cistercians, or White Monks, as they were popularly called, a branch of the great order of the Benedictines. The Cistercians made their first appearance in England about the year 1128, when they established themselves at Waverley in Surrey; but having once obtained a footing in the country, they spread rapidiy. In the 26th year of Henry VIII. the number of Cistercian abbeys in England amounted to seventy-five, of which thirty-six were included among the greater monasteries. There were also twenty-six nunneries of this rule. Of the Cistercian abbeys, that of Tintern appears, from the date of its foundation already given, to have been one of the oldest. It does not seem, however, to have been remarkable in the Catholic times, either for the number of its inmates or the extent of its possessions. At the dissolution it contained only thirteen monks, and its renta. according to Dugdale, amounted to no more than £132. 1s. 4d., although Speed makes it to have been £256. 11s. 6d. After the Reformation the place was

granted by the Crown to Henry, the second Earl of Worcester, the ancestor of the present Duke of Beaufort, whose property it now is.

The church, of which chiefly the existing ruins are the remnant, appears to have been erected some time after the foundation of the monastery. It is stated by William of Worcester that the monks celebrated their first mass in their new church in October, 1268; but it has been conjectured that even then only part of the building could have been erected. It was probably finished, however, in the course of the thirteenth or in the early part of the fourteenth century.

Archdeacon Coxe, in his 'Historical Tour through Monmouthshire, illustrated with views by Sir R. C. Hoare, Bart.' (4to. London, 1801), has given so complete and ably written an account of this ruin from personal inspection, that we will extract the greater part of his description, which will be found to be applicable in nearly all its parts to the present appearance of the abbey.

"We disembarked about half a mile above the village of Tintern, and followed the sinuous course of the Wye. As we advanced to the village, we passed some picturesque ruins hanging over the edge of the water, which are supposed to have formed part of the abbot's villa, and other buildings occupied by the monks; some of these remains are converted into dwellings and cottages, others are interspersed among the iron founderies and habitations.

"The first appearance of the celebrated remains of the abbey-church did not equal my expectations, as they are half concealed by mean buildings, and the triangular shape of the gable ends has a formal appearance.

"After passing a miserable row of cottages, and forcing our way through a crowd of importunate beggars, we stopped to examine the rich architecture of the west front; but the door being suddenly opened, the inside perspective of the church called forth an instantaneous burst of admiration, and filled me with delight, such as I scarcely ever before experienced on a similar occasion. The eye passes rapidly along a range of elegant Gothic pillars, and, glancing under the sublime arches which supported the tower, fixes itself on the splendid relics of the eastern window, the grand termination of the choir.

"From the length of the nave, the height of the walls, the aspiring form of the pointed arches, and the size of the east window, which closes the perspective, the first impressions are those of grandeur and sublimity. But as these emotions subside, and we descend from the contemplation of the whole to the examination of the parts, we are no less struck with the regularity of the plan, the lightness of the architecture, and the delicacy of the ornaments; we feel that elegance is its characteristic no less than grandeur, and that the whole is a combination of the beautiful and the sublime.

"The church was constructed in the shape of a cathedral, and is an excellent specimen of Gothic architecture in its greatest purity. The roof is fallen in, and the whole ruin open to the sky, but the shell is entire; all the pillars are standing, except those which divided the nave from the northern aisle, and their situation is marked by the remains of the bases. The four lofty arches which supported the tower, spring high in the air, reduced to narrow rims of stone, yet still preserving their original form. The arches and pillars of the choir and transept are complete; the shapes of all the windows may be still discriminated, and the frame of the west window is in perfect preservation; the design of the tracery is extremely elegant, and when decorated with painted glass, must have produced a fine effect. Critics who censure this window as too broad for its height, do not consider that it was not intended for a particular object, but to harmonize with the general plan; and had the architect diminished the breadth, in proportion to the height, the grand effect of the perspective would have been considerably lessened.

"The general form of the east window is entire, but the frame is much dilapidated; it occupies the whole breadth of the choir, and is divided into two large and equal compartments, by a slender shaft, not less than fifty feet in height, which has an appearance of singular lightness, and in particular points of view seems suspended in the air.

"Nature has added her ornaments to the decorations of art; some of the windows are wholly obscured, others partially shaded with tufts of ivy, or edged with lighter foliage; the tendrils creep along the walls, wind round the pillars, wreath the capitals, or hanging down in clusters obscure the space beneath.

"Instead of dilapidated fragments overspread with weeds and choked with brambles, the floor is covered with a smooth turf, which by keeping the original level of the church, exhibits the beauty of its proportions, heightens the effect of the grey stone, gives a relief to the clustered pillars, and affords an easy access to every part. Ornamented fragments of the roof, remains of cornices and columns, rich pieces of sculpture, sepulchral stones and mutilated figures of monks and heroes, whose ashes repose within these walls, are scattered on the green sward, and contrast present desolation with former splendour.

"Although the exterior appearance of the ruins is not equal to the inside view, yet in some positions, particularly to the east, they present themselves with considerable effect. While Sir Richard Hoare was employed in sketching the north-western side, I crossed the ferry, and walked down the stream about half a mile. From this point the ruins, assuming a new character, seem to occupy a gentle eminence, and impend over the river without the intervention of a single cottage to obstruct the view. The grand east window, wholly covered with shrubs, and half mantled with ivy, rises like the portal of a majestic edifice embowered in wood. Through this opening and along the vista of the church, the clusters of ivy, which twine round the pillars or hang suspended from the arches, resemble tufts of trees; while the thick mantle of foliage, seen through the tracery of the west window, forms a continuation of the perspective, and appears like an interminable forest."

The different picturesque views which adorn the banks of the Wye, and especially Tintern Abbey, have been described or celebrated by a profusion of writers both in prose and verse. Grose's English Antiquities, Ireland's Picturesque Views on the Wye, Whateley's Ornamental Gardening, and Gilpin's Observations on the River Wye, relative chiefly to picturesque beauty (1789), may all be consulted with advantage. Among our poets, the abbey has been noticed by Mason, and a poem, entitled 'The Banks of the Wye,' appeared some years ago from the pen of Robert Bloomfield. But this scene has now been long endeared to all the lovers of song by Wordsworth's 'Lines composed a few miles above Tintern Abbey, on revisiting the banks of the Wye during a tour;' dated July 13th, 1798, and first published in the 'Lyrical Ballads.' It would be to injure the poem to give only an extract from it; but we may probably take an opportunity of laying it entire before our readers in an early number of the Magazine.

ON THE PRONOUNS USED IN ADDRESSING PERSONS.

It is a curious fact, that in the languages of modern Europe the pronoun of the second person singular—'thou'—is almost banished from polite conversation, and in many instances the use of this natural and innocent word would subject the speaker to the imputation of gross ignorance, or intentional rudeness. Nay more; in some languages the word which corresponds to our

'you' is also uncourtly; and a foreigner might be thought absurdly familiar, who was merely misled by his dictionary and grammar, into a literal translation of the most polite pronoun of his native tongue. We will illustrate these observations by showing the usage of these words in four of the principal languages of Europe.

In English the pronoun 'thou' may be considered as nearly obsolete in colloquial language, being confined to the rustics of the remoter counties, and the Society of Friends; it cannot therefore with us be considered as a mark of tenderness or familiarity, but rather a solemn word, appropriated to the highest style of composition. Some centuries since, however, it was still a mark of familiarity, and as such was deeply resented by those who supposed that their station in society merited the superior pronoun:—

> " Avaunt caitiff, dost thou *thou* me?
> I am come of good kin,"

says a character in the old morality of Hicke-Scorner.

In France the pronoun *tu* (thou) is much more extensively employed; it is the token of love and friendship, and is used by parents to their children, and by schoolfellows to each other; in fact, wherever unceremonious fondness is intended to prevail, 'tu' necessarily comes in; *vous* (you) is used in the ordinary intercourse of society.

Let us cross the Alps, and we find that another distinction has gained ground. In Italy *three* pronouns are made use of, *tu* (thou), *voi* (you), and *lei* (she or her). Perhaps it may be sufficient to say that the use of 'tu' denotes familiarity with fondness, 'voi' familiarity without fondness, and 'lei' respect. It is in the use of the latter pronouns that an Englishman would be misled by his grammar, and for the following reason. The most popular Italian grammar used in this country is translated from one written by Veneroni. Italian secretary to Louis XIV.; and as in the edition of this grammar, printed at London in the year 1831, we are taught how to direct one letter to the Archbishop of Cologne, Electoral Prince of the Holy Roman Empire, and another letter to a Counsellor of the Parliament of Paris (offices which have ceased), so we are instructed in the majority of the dialogues to use 'voi' instead of 'lei,' or, in other words, to use a mode of speaking, which though perfectly polite in the year 1700, is unbearably rude at the present day.

In Germany an additional nicety has gained ground, for there four pronouns are used, namely, *Du*, *ihr*, *er*, or *sie*, in the singular, and *sie* in the plural—and all in addressing one single person. 'Du,' like the corresponding pronouns in France and Italy, is appropriated to love and intimacy. " Children," says Dr. Noehden, " are sometimes allowed to speak to their parents in the same manner; though in general the third person plural, 'sie,' is preferred, as more respectful. Lastly, 'du' is the reverse of ceremonious politeness, and thus it is applied where particular distinctions are laid aside. Therefore, it is commonly made use of in speaking to very little children, and to persons in very subordinate situations; for example, by the officer to his soldiers. It is often heard in quarrels and opprobrious language, when the considerations of decorum and propriety are disregarded. All these significations may be reduced to the notion of familiarity, differently qualified. See a charming passage in Schiller's Don Carlos, at the end of the first act—I mean in the original; for the translations give but a faint and imperfect idea. It begins thus:—

> 'Und jetzt noch eine bitte, lieber—Nenne mich *du*—u. s. w.'
>
> And now one more request, my dearest friend—Do call me *thou*, &c.

The word *ihr*, or you, is now rarely used in addressing one person, and is by no means elegant or polite; in the earliest ages of the German empire, however, we are assured by Adelung, it was far otherwise, and it was applied to persons of rank; and even now the kindred adjective *euer* (abbreviated *ew.*) still retains its station. The vulgar phrases 'Ein pferd oder ein kleid das ihr heisst'—A horse or a coat that is called you, i. e. that is excellent, still shadow forth the long-lost reputation of the degraded 'ihr.'

" Since the plural of the third personal was adopted, as the polite mode of address, the singular has been reserved for the lower stations of life: namely, *Er*, he, for a male; and *sie*, she, for a female. In this manner the master and mistress address their servants. Thus a person of rank, in the consciousness of his preeminence, will speak to tradespeople, and the prince to his subjects. Yet those persons frequently forget the comparative height on which they stand, and are carried along the stream of general politeness. Servants, however, are seldom spoken to in any other way than the singular of the third personal: also those in a mean situation, such as common handicraftsmen, peasants, labourers, and others."—Noehden's German Grammar, 4th edit. p. 207.

Sie, or they, is the pronoun used on all ordinary occasions, and almost the only method of address that the mere traveller in Germany has occasion to employ.

Much more might have been said upon this subject, and it might have been illustrated by quotations from ancient and modern authors in the above-mentioned languages.

Rapid Improvement of London.—I went to England again on a short visit in 1829. An interval of but four years had elapsed; yet I was amazed at the increase of London. The Regent's Park, which, when I first knew the west end of the town, disclosed nothing but lawns and fields, was now a city. You saw long rows of lofty buildings, in their outward aspect magnificent. On this whole space was set down a population of probably not less than fifty or sixty thousand souls. Another city, hardly smaller, seemed to have sprung up in the neighbourhood of St. Pancras Church and the London University. Belgrave Square, in an opposite region, broke upon me with like surprise. The road from Westminster Bridge to Greenwich exhibited for several miles compact ranges of new houses. Finchley Common, desolate in 1819, was covered with neat cottages, and indeed villages. In whatever direction I went, indications were similar. I say nothing of Carlton Terrace, for Carlton House was gone, or of the street, of two miles, from that point to Park Crescent, surpassing any other in London, or any that I saw in Europe. To make room for this new and spacious street, old ones had been pulled down, of which no vestige remained. I could scarcely, but for the evidence of the senses, have believed it all. The historian of the Decline and Fall of the Roman Empire remarks, that the description, composed in the Theodosian age, of the many stately mansions in Rome, might almost excuse the exaggeration of the poet; that Rome contained a multitude of palaces, and that each palace was equal to a city. Is the British metropolis advancing to this destiny?—*Rush's Residence at the Court of London.*

Sea-weed Banks.—The *Sargassum vulgare*, the tropic grape of sailors, and the Fucus natans of the older writers, is worthy attention, not only from its wandering habits, quitting as it does the submarine soil to which it probably in its early stages is attached, but also for the astonishing profusion in which it so frequently is found. It only grows within forty degrees of latitude on either side of the equator, but currents often cast it on our coast. It is a remarkable circumstance in the history of this plant, that it is chiefly local in its position, even when detached, forming two great banks, one of which is usually crossed by vessels homeward bound from Monte Video, or the Cape of Good Hope; and so constant are they in their places, that they assist the Spanish pilots to rectify their longitude. It is probable that these banks were known to the Phœnicians, who in thirty days' sail with an easterly wind, came into what they called the " Weedy Sea;" and to the present day, by the Spaniards and Portuguese, the chief tract is named Mar de Zargasso. It was the

entering of such fields of fucus as these that struck so much terror into the minds of the first discoverers of America; for sailing turdily through extensive meadows for days together, the sailors of Columbus superstitiously believed that the hinderance was designed by heaven to stay their adventurous course: hence they wildly urged their commander to proceed no further, declaring that through the banks thus woven by nature, it would be presumptuous impiety to force a way.—*Burnett's Outlines of Botany.*

Phosphorescent Lichens.—Several species, especially *subcorticalis*, *subterranea*, and *phosphorea*, are occasionally phosphorescent, and more or less luminous in the dark; and hence they often give to the cellars and mines in which they grow an extraordinary and brilliant appearance. In the coal mines in the vicinity of Dresden they are said to be so abundant and so luminous, as even to dazzle the eye by the brilliant light that they afford. This light is increased by the warmth of the mines; so that, hanging in festoons and pendents from the roof of the various excavations, twisting round the pillars, and covering the walls, they are said, by their brightness, to give to the Dresden coal mines, in which they abound, the semblance of an enchanted palace. Mr. Erdman, the commissioner of mines, thus describes the appearance of the Rhizomorphæ in one he visited:—"I saw the luminous plants here in wonderful beauty; the impression produced by the spectacle I shall never forget. It appeared, on descending into the mine, as if we were entering an enchanted castle. The abundance of these plants was so great, that the roof, and the walls, and the pillars, were entirely covered with them, and the beautiful light they cast around almost dazzled the eye. The light they give out is like faint moonshine, so that two persons near each other could readily distinguish their bodies. The lights appear to be most considerable when the temperature of the mines is comparatively high."—*Burnett's Outlines of Botany.*

BIRDS AND INSECTS.

There cannot be any question of the immense number of insects required by birds during the breeding season. It is stated by Bingley, that a pair of small American birds, conjectured to be the house-wren, were observed to leave the nest and return with insects from forty to sixty times in an hour, and that in one particular hour, they carried food no fewer than seventy-one times. In this business they were engaged during the greatest part of the day. Allowing twelve hours to be thus occupied, a single pair of these birds would destroy at least six hundred insects in the course of one day; on the supposition that the two birds took only a single insect each time. But it is highly probable that they often took more.

Looking at the matter in this point of view, the destruction of insectivorous birds has in some cases been considered as productive of serious mischief. One striking instance we distinctly recollect, though we cannot at this moment turn to the book in which it is recorded. The numbers of the crows or rooks of North America were, in consequence of state rewards for their destruction, so much diminished, and the increase of insects so great, as to induce the state to announce a counter[illegible]ward for the protection of the crows. Such reward[illegible] common in America; and from a document given [illegible] Wilson, respecting a proposal made in Delaware "[illegible] banishing or destroying the crows," it appears that the money thus expended sometimes amounts to no inconsiderable sum. The document concludes by saying, "The sum of five hundred dollars being thus required, the committee beg leave to address the farmers and others of Newcastle county and elsewhere on the subject."

From its sometimes eating grain and other seeds, "the rook," says Selby, "has erroneously been viewed in the light of an enemy by most husbandmen; and in several districts attempts have been made either to banish it, or to extirpate the breed. But wherever this measure has been carried into effect, the most serious injury to the corn and other crops has invariably followed, from the unchecked devastations of the grub and caterpillar. As experience is the sure test of utility, a change of conduct has in consequence been partially adopted; and some farmers now find the encouragement of the breed of rooks to be greatly to their interest, in freeing their lands from the grub of the cockchafer, an insect very abundant in many of the southern counties. In Northumberland I have witnessed its usefulness in feeding on the larvæ of the insect commonly known by the name of Harry Longlegs, which is particularly destructive to the roots of grain and young clovers."

It has on similar grounds been contended, that the great number of birds caught by bird-catchers, particularly in the vicinity of London, has been productive of much injury to gardens and orchards. So serious has this evil appeared to some, that it has even been proposed to have an act of parliament prohibiting bird-catchers from exercising their art within twenty miles of the metropolis; and also prohibiting wild birds of any kind from being shot or otherwise caught or destroyed within this distance, under certain penalties. It is very clear, however, that such an act could never be carried; and though it *might* be advantageous to gardens, orchards, and farms, yet the attacks which the same birds make on fruit would probably be an equivalent counterbalance.

In the case of swallows, on the other hand, it has been well remarked by an excellent naturalist (the Rev. W. T. Bree), that they are to us quite inoffensive, while "the beneficial services they perform for us, by clearing the air of innumerable insects, ought to render them sacred and secure them from our molestation. Without their friendly aid the atmosphere we live in would scarcely be habitable by man: they feed entirely on insects, which, if not kept under by their means, would swarm and torment us like another Egyptian plague. The immense quantity of flies destroyed in a short space of time by one individual bird is scarcely to be credited by those who have not had actual experience of the fact." He goes on to illustrate this from a swift, which was shot. "It was in the breeding season when the young were hatched; at which time the parent birds, it is well known, are in the habit of making little excursions into the country to a considerable distance from their breeding places, for the purpose of collecting flies which they bring home to their infant progeny. On picking up my hapless and ill-gotten prey, I observed a number of flies, some mutilated, others scarcely injured, crawling out of the bird's mouth; the throat and pouch seemed absolutely stuffed with them, and an incredible number was at length disgorged. I am sure I speak within compass when I state that there was a mass of flies, just caught by this single swift, larger than when pressed close, could conveniently be contained in the bowl of an ordinary table-spoon."—*Habits of Birds. Library of Entertaining Knowledge.*

THE PELICAN.

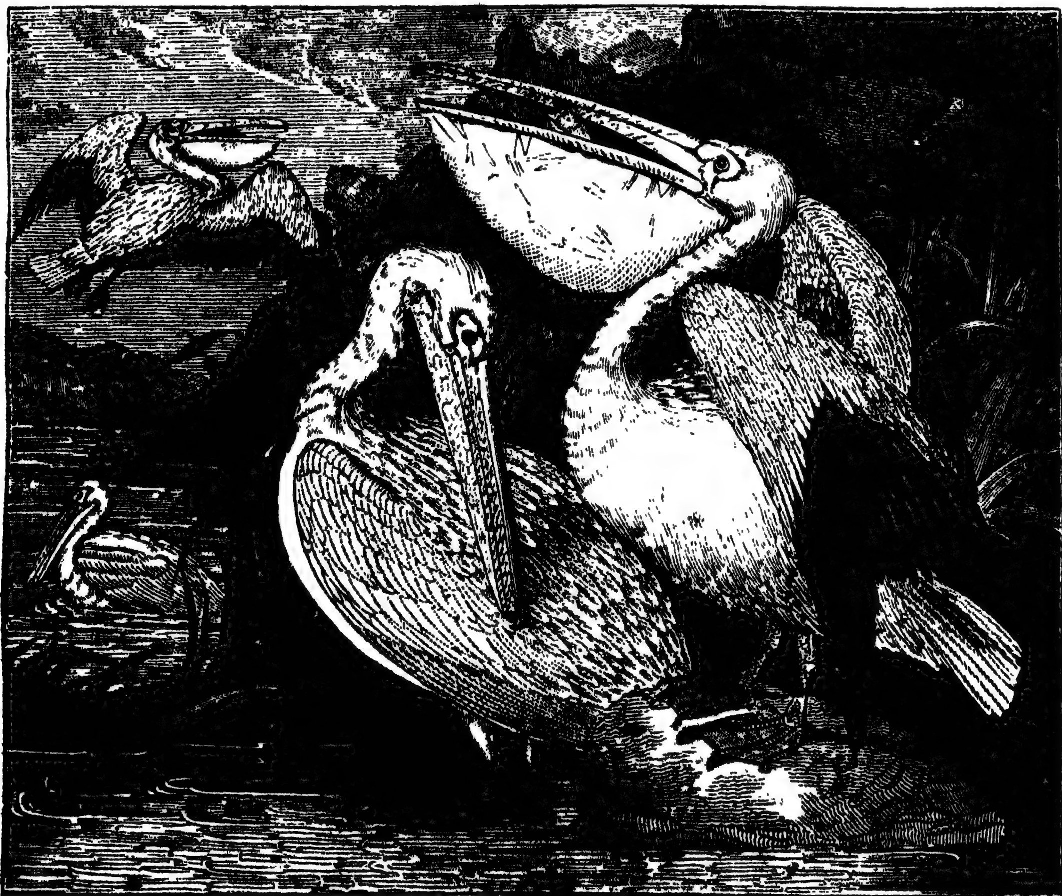
The wood-cut at the conclusion of this article represents a group of pelicans, drawn from specimens in the Zoological Gardens. The bird is familiar to most persons; for it has long been a favourite of the showman, who sometimes astonishes his visitors by placing his head under the large membrane, or bag, of the lower mandible, and then drawing it over his skull, like a cap. The showman is not only ready to perform this feat; but he delights to tell his audience those wonderful stories which are popularly associated with the history of the pelican, and which, indeed, have been as attractive to the old writers of natural history, and to the poets, as to the most credulous and uninstructed. Nobody, perhaps, now believes that this singular bird feeds its young with its blood, although the pictures of the travelling

menageries give us the most faithful representations of such a surprising circumstance; but there are many who consider that the use which the pelican makes of its great bag, is to carry a provision of water to its young across the desert. The real history of the pelican contradicts these fancies; they belong to poetry and romance, in which they may be beautifully employed. The notion that the mother-bird carries water across the desert has been adorned with many curious details,—such as that she pours out the grateful supply into her rocky nest—that her young there bathe themselves—and that the beasts of the forest instinctively seek out the spot, and having assuaged their thirst, leave the pelican family unmolested. Southey has told this story in his Thalaba:—

"The desert pelican had built her nest
In that deep solitude,
And now, returned from distant flight,
Fraught with the river stream,
Her load of water had disburthen'd there;
Her young in the refreshing bath
Dipt down their callow heads,
Fill'd the swoln membrane from their plumeless throat
Pendant, and bills yet soft;
And buoyant with arch'd breast,
Plied in unpractis'd stroke
The oars of their broad feet.
They, as the spotted prowler of the wild
Laps the cool wave, around their mother crowd,
And nestle underneath her outspread wings.
The spotted prowler of the wild
Lapt the cool wave, and satiate, from the west,
Guiltless of blood, withdrew."

Thalaba, book v.

Pelicans are residents upon the banks of rivers and lakes, and upon the sea-coasts. They habitually feed on fish, although they will sometimes devour reptiles and small quadrupeds. They are capable of rapid flight, and have an extraordinary power of ascending on high. This power is called into action by their mode of fishing. When they perceive, from their elevated position, a fish, or fishes, on the surface of the water, they dart down with inconceivable rapidity, and flapping their large wings so as to stun their prey, fill their pouches, and then retire to the shore to satisfy their voracious appetites. The fish thus carried away in the pouch undergo a sort of maceration before they are received into the stomach; and this grinding process renders the food fit for the young birds. No doubt the sanguinary traces which this operation leaves upon the plumage of the mother, have given birth to the fable that she feeds her nestlings with her blood.



[Pelicans, from Specimens in the Gardens of the Zoological Society.]

The pelicans, as well as the corvorants, sometimes rest perched upon the branches of trees; but they never build their nests in such a position. They always select a fracture of a rock, as near as possible to water. The male and female both labour to construct this nest, which is large and deep, and lined with moss and downy feathers. The female lays from two to four eggs, upon which she sits with unwearied patience for forty-three days, receiving sustenance from the male during the whole time. The young birds are at first grey; but their feathers attain their splendid white colour after the third moulting.

There are several species of pelican, of which the white, or common, bears the scientific name of *Pelicanus onocrotalus*. They are found either in flocks, or singly, principally in Asia, Africa, and South America, and sometimes in the south of Europe.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

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THE CHURCH OF ST. MACLOU, AT ROUEN.



[View of the North Side of the Church of St. Maclou.]

The architectural antiquities of Normandy present objects of peculiar interest to the English traveller. From the period of the Conquest to the reign of Henry VI., Normandy and England were, with little interruption, under the same dominion; a continual intercourse was carried on by the people of each country; and hence there was a great similarity in the arts and customs of each, especially in their architecture. This similarity is very marked in the earlier specimens of Gothic buildings which exist in the two countries, in which there is scarcely any difference that can be considered national. But after the separation of Normandy from the crown of England, our architecture began to exhibit many innovations which are not to be found in the Norman edifices of the same period. Thus the church of St. Maclou, which was erected as late as the year 1512, presents none of those more striking deviations from the style of the two preceding centuries which became common in England after the reign of Edward IV., and are distinguished as the Tudor architecture. In this point of view the buildings of particular countries afford the most authentic monuments of their history, and thus possess an interest beyond the gratification which they afford by their beauty or vastness.

The western front of the church of St. Maclou is remarkable for a porch of three arches, somewhat resembling the great entrance of Peterborough Cathedral. The carved doors of the church are amongst its most beautiful ornaments. They are the work of Jean Goujon, an artist of such eminence as to have been named the 'Corregio of Sculpture.' The central tower of the church very nearly resembles that of the cathedral of Rouen, a work of much earlier date. Many parts of the interior have also this resemblance. Indeed the general character of this church would lead the casual observer to refer the date of its erection to the fourteenth century; but some peculiarities, such as the bosses of the groined roof, show to the antiquary that it belongs to the French architecture of the sixteenth century. The central tower was formerly surmounted by a spire of singular beauty; but this was greatly damaged by a hurricane in 1705, and was taken down thirty years afterwards.

The church of St. Maclou was not erected, as were most of the great Gothic buildings, out of royal or ecclesiastical resources. It was built by funds contributed by the people for the purchase of indulgences or permissions from the Archbishop of Rouen, to sin without penance, for forty and even a hundred days. The sale of indulgences at Rome was the principal exciting cause of that resistance to the Papal power which ended in the Reformation.

A SETTLER'S CABIN IN SOUTH AFRICA.

In former articles I have described our mode of travelling from the coast to the interior, the aspect of the glen allotted for our location, and our wars with the wild beasts with whom we had to contend for its possession. I shall now give a brief sketch of the first habitation which I erected on my own grounds, after our *location* had been subdivided, the united encampment of the party broken up, and the several families removed to their respective allotments.

The site which I selected for my residence was about three miles distant from my neighbours on either side; Mr. Rennie being on the stream above me, and Captain Cameron below, with rocky heights and clumps of shrubbery intervening. I selected an open grassy meadow, with a steep mountain behind, and the small river in front, bordered by willow-trees and groves of the thorny acacia. It was a beautiful and secluded spot; the encircling hills sprinkled over with evergreens, and the fertile meadow-ground clothed with rich pasture, and bounded by romantic cliffs crowned with aloes and euphorbias.

As the hut I was about to erect was only intended for a temporary residence, I adopted, with some variations, the mode practised by the natives in constructing their simple habitation. Drawing a circle on the ground of about eighteen feet in diameter, I planted, upright round this circle, about twenty tall willow-poles; digging, with an old bayonet, holes in the ground, just large enough to receive their thicker ends. I then planted a stouter pole exactly in the centre, and, drawing together the tops of the others, I bound them firmly to this central tree with thongs of quagga's hide. With the same ligature pliant spars or saplings were bound round the circle of poles, at suitable intervals, from bottom to top; and thus the wicker frame or skeleton of a cabin was completed, exactly in the shape of a bee-hive or sugar-loaf. It was then thatched with reeds, the ends of the first layer being let about a couple of inches into the earth. Spaces were left for a door and a small window; but neither fire-place nor chimney formed part of our plan. A convenient door, to open in two halves, was soon constructed of the boards of some packing cases; and a yard of thin cotton cloth stretched upon a wooden frame formed a suitable window.

With the assistance of my Hottentot servants I then proceeded to plaster the interior to the height of about six feet. The plaster was formed of fresh cow-dung mixed with an equal portion of sand, a composition almost universally in use in the interior of the Cape Colony, where lime is scarce and expensive, and where, from the dryness of the climate, this substitute serves for every ordinary purpose almost equally well. When the plaster was dry, the whole was washed over with a sort of size, composed of pipe-clay and wood-ashes diluted with milk, forming a handsome and durable greyish stone colour.

Thus secured externally, the next point was to lay a dry and firm floor below foot; and, in this, as in many other points, I thankfully received instruction from the Hottentots. Following their advice, I directed a dozen or two of large ant-hillocks, of which there were hundreds within view, to be broken up and brought into the hut, selecting those that had been previously pierced and sacked by the ant-eater, (*aardvark*,) and which were generally destitute of inhabitants. This material, from having been apparently cemented by the insect architects with some glutinous substance, forms, when pounded and sprinkled with water, a strong adhesive mortar, which only requires to be well kneaded with trampling feet for a few days in order to become a dry and compact pavement, almost as solid and impenetrable as stone or brick.

With the aid of my native assistants I had thus obtained a commodious African cabin, about eighteen feet in diameter, and nineteen feet high in the centre. In that serene and mild climate this was sufficient for shelter; but for comfort something more was necessary. Except cooking utensils, travelling-trunks, and some cases of books, I had brought with me nothing in the shape of furniture; nor was it possible to procure any nearer than Graham's Town, at the distance of 130 miles; and even then, such was the scarcity or the idleness of the mechanics, that one might probably be obliged to wait twelve months for the execution of an order, besides paying an extravagant price for very common articles. Luckily I had brought out a small assortment of carpenters' tools, and was not altogether unacquainted with the use of them; for I had been, when a boy, particularly fond of observing mechanics at work, and of amusing myself by cabinet-making on a small scale.

Diligently applying myself to the use of the hatchet, saw, and auger, and stimulated by necessity, "the mother of invention," I contrived, in the course of a few weeks, to have my little cabin commodiously and com-

pletely furnished. First I partitioned off from the outer apartment a small bed-room, so contrived, that, by drawing a curtain or two, it could be lighted and ventilated at pleasure. In this I constructed a bedstead; the frame being formed of stout poles of wild olive from a neighbouring thicket, with the smooth shining bark left on them; and the bottom to support the mattress, consisting of a strong elastic net-work of thongs of bullock's or quagga's hide interlaced. With similar materials I made a sofa for the outer apartment, which also served occasionally for a sleeping couch; together with the frame of a table, (the top being of yellow-wood plank,) a few forms and stools; and lastly an arm chair, which I considered my *chef-d'œuvre*. Not one of these, excepting the table, had the touch of a plane upon it. But they looked nothing the worse for that; and the cabin and its rude furniture had somewhat the aspect of a rustic summer house or grotto. My books, ranged high on a frame of spars over the bed-room, with a couple of firelocks slung in front, a lion's and leopard's skin or two stretched along the thatch above, with horns of antelopes and other country spoils interspersed, completed the appropriate decorations of my African cabin.

A few huts, of a similar but still ruder construction, were erected behind my own for the accommodation of my native domestics and herdsmen, and for a store-room and kitchen. When these and the folds for the flocks and herds were finished, the establishment was considered, for the time, complete. The work of inclosing, cultivating, and irrigating a portion of land for a garden, orchard, and corn crops was a task requiring much time and labour; but of which I shall now omit the details.

Suffice it to say, that in this "lodge in the vast wilderness," with no other inmates than my wife, and occasionally another female relative,—with only simple Hottentots for servants and dependents,—and in the midst of a wild region, haunted by beasts of prey, and occasionally by native banditti, (Bushmen and Caffre marauders from the eastern frontier,) I spent two years, which, though clouded by some disappointments and occasional privations, were, on the whole, among the pleasantest of my life. The disappointments we bore as we could; the privations we soon learned to laugh at. A specimen or two of the latter may serve to amuse the reader, and shall conclude my present sketch.

After we had got a competent share of live stock on our farms, and had brought a portion of soil under cultivation, we ran no risk of wanting the *necessaries* of life. We killed our own beef and mutton; we had milk, butter, and cheese; we reared abundance of poultry; we cultivated with success, potatoes, pumpkins, melons, all the ordinary esculent vegetables, and some not known in Europe. We learned from our Dutch-African neighbours to make our own soap and candles, and to manufacture from the skins of our sheep and goats, tanned with mimosa bark, excellent leather for jackets and trousers—and which supplied a sort of clothing well adapted for a country full of thorny trees and jungles. All that we had occasion to purchase, therefore, was a few *luxuries*—such as tea, coffee, sugar, wine, spices, &c. We usually got a sufficient quantity at a time, from Cape Town, or Algoa Bay, to last us a considerable period; but once or twice our store being exhausted before the new supply arrived, we found ourselves entirely destitute of the most important of these articles, tea, coffee, and sugar.

We were once subjected to a more serious privation. In the summer of 1822, we were visited by a severe drought, which endured for many months, and inflicted no small damage on our gardens and corn-fields. We had grain enough in store, however, and could dispense with fruit and vegetables. But at length our little river ceased to flow; and although we had enough of water in standing pools and fountains for ourselves and our cattle to drink, all the mills on the river being stopped for want of water, we could not get our wheat ground into flour, and were soon left without bread. As all our neighbours were nearly in the same situation, we could neither borrow nor purchase. Our Dutch-African neighbours and our Hottentot servants took the matter very quietly. They could live very well on mutton and boiled corn, they said, for a month or two, till rain fell. Indeed many of them in the arid country live entirely on animal food and milk, without either bread or vegetables. But it was different with us: we felt the want of *bread* a grievous privation. For a week or two we made a shift to grind a daily supply with our coffee mill; but this at length also failed. The iron handle was repeatedly broken; and though I had enough of smith's craft to repair it twice, the third fracture was beyond my skill; and we were then reduced to grind, or rather to bruise, our corn, by crushing a few grains at a time with a round stone upon a flat one. By this tedious process we procured a small cake or two daily; and with this we were forced to content ourselves, until we could obtain a supply of flour from a distance. This was a *real* privation: but, after all, I must not forbear to add, that these same cakes, baked of coarse meal ground between two stones, and occasionally of my own grinding, made the sweetest bread, I think, I ever tasted.

T. P.

ÆGINA.

"Why need we say that Ægina is one of the most celebrated of islands,—the native country of Æacus and the Æacidæ, which once enjoyed the dominion of the seas, and contended with Athens itself for the prize of superior glory in the battle with the Persian fleet of Salamis?"

Such are the emphatic words with which the ancient geographer, Strabo, introduces his elegant and accurate description of this remarkable island, which is situated in a beautiful gulf of the same name, slightly corrupted by the modern Greeks into Eg'hina. At the head of this deep gulf stands Cape Colonna, crowned with the fine columns of the temple of Minerva Sunias at the right; and, on the left, the bold rocky promontory of Skyli, the shores of Attica, of Megara, and of the Peloponnesus, all rising into hills of considerable elevation and of very picturesque forms, embrace the gulf, which, besides Ægina, is dotted with many small islands and rocks that group in the most picturesque manner.

The writer of this short notice had ample means of learning the beauty of the scene, which is one of the finest he saw on the coast of Greece; for, in the summer of 1827, he was detained three days at the mouth of the gulf of Ægina by dead calms and contrary winds. The whole of the shores of the Levant he visited are subject, in summer, to a silvery haze or mist, seen through the medium of which all objects have a deliciously delicate colour, and at times assume the most singular appearances,—the haze at sea producing something like the effects of the mirage in the deserts. One morning, on looking up the gulf from near Cape Colonna, he saw Ægina and all the other islets in view, suspended, as it were, in the air many feet above the level of the sea, while the surrounding mountains were striped here and there, from their summit to their base, with broad lines of white mist which appeared precisely like so many waterfalls.

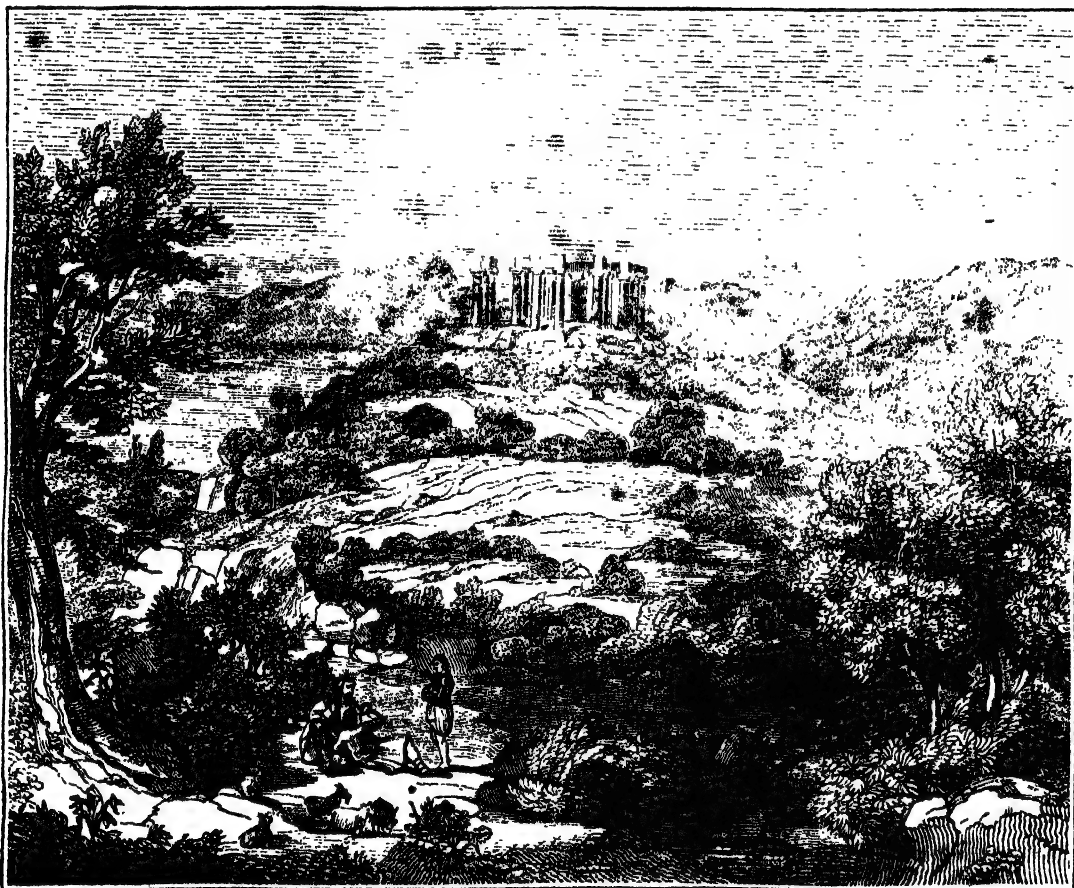
Towards evening this silvery haze entirely disappears; every object re-assumes its own form and position, and then indeed it is glorious to see—

"Along Morea's hills the setting sun."

At the time of the writer's stay there the whole of those seas were infested with piratical boats, manned by

Greeks who had been driven to robbery by starvation and despair, at what they then considered the utter neglect of them and their cause by all European nations; yet, though there might be danger in their approach, he could not sufficiently admire the beauty of their little vessels as they scudded across the gulf of Ægina or darted out from beneath Cape Colonna,—a beauty considerably increased by their generally having their sail-cloth dyed of a delicate red or rose colour.

The island of Ægina, one of the finest features in this scene, does not exceed nine miles in its greatest length, nor six miles in its greatest breadth; its interior is rough and mountainous, and the valleys, which are made to bear corn, cotton, olive and fruit trees, are narrow and stony. Yet in ancient days, through the blessings of commerce, this spot in the seas of Greece was the residence of a numerous and most thriving population, who erected upon it such works as are still the admiration of the civilized world, though they are now in ruins, and the place of those who built them scantily occupied by an impoverished and degraded race of men. The position of these islanders was favourable for trade. At the end of the gulf they were only separated from the Gulf of Corinth (now Lepanto) by a very narrow isthmus; and from the head of the gulf, sailing by Cape Colonna or Cape Skyli, their vessels had easy access to the whole of the Greek coast and clustering islands; and, standing across the Mediterranean, by an open navigation, would reach the rich and civilized island of Crete, and the ports of Egypt and Syria. The place had also the advantage of security; an important point in the earlier ages of Greece, when piracy was a common and honourable profession, and no defenceless town near the sea safe from plunder. It lay deep within a gulf; nature had made access to its shores difficult, by nearly encircling them with rocks and sand-banks; and its industrious population added artificial defences. Its port also was commodious and well protected against the attacks of man. Here, therefore, the goods procured, far and near, by the enterprising inhabitants could be lodged without fear of pillage, and the Greeks would resort hither as to a general mart, where whatever they wanted might be purchased. Wealth would thus flow into the island, and its inhabitants, with their exquisite feeling for all that was beautiful—a feeling the Greeks possessed above all other people we are acquainted with—would employ that wealth in cultivating the fine arts, and in covering their barren rocks with grand and graceful edifices.



[View in Ægina, with the Temple of Jupiter Panhellenus.]

To the old inhabitants of Ægina are attributed the honours of having been the first to coin silver money, and of having introduced a style of art in sculpture, superior to all that preceded it, though inferior to the ultimate perfection of the Athenian or Attic school. Some antiquaries and connoisseurs are of opinion that they only shared the latter honours with Corinth and Sicyon; but however this may have been, Pausanias calls it exclusively the Æginetan, and the style seems to have borne the name of this people generally.

The reader will find in the *Penny Cyclopædia* a critical notice of this style of art, as also a plan and detailed description of the temple of Jupiter Panhellenus, with several other things excluded by our limits here. The engraving in this page is a somewhat distant view of all that remains of the celebrated temple just mentioned, which stands on the summit of a hill, rough and stony, and partially covered with mastic bushes, cedars, and fir trees. Anciently the hill also was called Panhellenium, from the temple that so nobly crowned it. "This temple," says Colonel Leake, "was erected upon a large paved platform, and must, when complete, have been one of the most remarkable examples in Greece of the majesty and beauty of its sacred

edifices, as well as of the admirable taste with which the Greeks enhanced those qualities by an attention to local situation and surrounding scenery. It is not only in itself one of the finest specimens of Grecian architecture, but is the more curious as being, in all probability, the most ancient example of the Doric order in Greece, with the exception of the columns at Corinth." The site of this sublime temple commands a prospect sublimer still.

Besides the Panhellenium, there still exist in Ægina two columns of a temple and several other ruins, which, however, are mere indications of what has been. The island is famous for its almonds and figs. Wild doves and wild pigeons are found in countless numbers, as they are round Cape Colonna and in all the neighbouring coasts and islands.

LINES,

[Composed a few miles above Tintern Abbey, on revisiting the Banks of the Wye during a Tour. July 13, 1798.]

Five years have past; five summers, with the length
Of five long winters! and again I hear
These waters, rolling from their mountain-springs
With a sweet inland murmur*.—Once again
Do I behold these steep and lofty cliffs,
That on a wild secluded scene impress
Thoughts of more deep seclusion; and connect
The landscape with the quiet of the sky.
The day is come when I again repose
Here, under this dark sycamore, and view
These plots of cottage-ground, these orchard-tufts,
Which at this season, with their unripe fruits,
Are clad in one green hue, and lose themselves
Among the woods and copses, nor disturb
The wild green landscape. Once again I see
These hedge-rows, hardly hedge-rows, little lines
Of sportive wood run wild; these pastoral farms
Green to the very door; and wreaths of smoke
Sent up, in silence, from among the trees!
With some uncertain notice, as might seem,
Of vagrant Dwellers in the houseless woods,
Or of some Hermit's cave, where by his fire
The Hermit sits alone.
These beauteous Forms,
Through a long absence, have not been to me
As is a landscape to a blind man's eye:
But oft, in lonely rooms, and 'mid the din
Of towns and cities, I have owed to them,
In hours of weariness, sensations sweet,
Felt in the blood, and felt along the heart;
And passing even into my purer mind,
With tranquil restoration:—feelings too
Of unremembered pleasure: such, perhaps,
As have no slight or trivial influence
On that best portion of a good man's life,
His little, nameless, unremembered acts
Of kindness and of love. Nor less, I trust,
To them I may have owed another gift,
Of aspect more sublime; that blessed mood,
In which the burthen of the mystery,
In which the heavy and the weary weight
Of all this unintelligible world,
Is lightened:—that serene and blessed mood,
In which the affections gently lead us on,—
Until, the breath of this corporeal frame
And even the motion of our human blood
Almost suspended, we are laid asleep
In body, and become a living soul:
While with an eye made quiet by the power
Of harmony, and the deep power of joy,
We see into the life of things.
If this
Be but a vain belief, yet, oh! how oft,
In darkness, and amid the many shapes
Of joyless daylight; when the fretful stir
Unprofitable, and the fever of the world,
Have hung upon the beatings of my heart,
How oft, in spirit, have I turned to thee,
O sylvan Wye! Thou wanderer thro' the woods,
How often has my spirit turned to thee!

And now, with gleams of half-extinguished thought,
With many recognitions dim and faint,
And somewhat of a sad perplexity,
The picture of the mind revives again:
While here I stand, not only with the sense
Of present pleasure, but with pleasing thoughts
That in this moment there is life and food
For future years. And so I dare to hope,
Though changed, no doubt, from what I was when first
I came among these hills; when like a roe
I bounded o'er the mountains, by the sides
Of the deep rivers, and the lonely streams,
Wherever nature led: more like a man
Flying from something that he dreads, than one
Who sought the thing he loved. For nature then
(The coarser pleasures of my boyish days,
And their glad animal movements all gone by,)
To me was all in all.—I cannot paint
What then I was. The sounding cataract
Haunted me like a passion: the tall rock,
The mountain, and the deep and gloomy wood,
Their colours and their forms, were then to me
An appetite—a feeling and a love,
That had no need of a remoter charm,
By thought supplied, or any interest
Unborrowed from the eye.—That time is past,
And all its aching joys are now no more,
And all its dizzy raptures. Not for this
Faint I, nor mourn nor murmur; other gifts
Have followed, for such loss, I would believe,
Abundant recompense. For I have learned
To look on nature, not as in the hour
Of thoughtless youth; but hearing oftentimes
The still, sad music of humanity,
Nor harsh nor grating, though of ample power
To chasten and subdue. And I have felt
A presence that disturbs me with the joy
Of elevated thoughts; a sense sublime
Of something far more deeply interfused,
Whose dwelling is the light of setting suns,
And the round ocean and the living air,
And the blue sky, and in the mind of man:
A motion and a spirit that impels
All thinking things, all objects of all thought,
And rolls through all things. Therefore am I still
A lover of the meadows and the woods,
And mountains; and of all that we behold
From this green earth; of all the mighty world
Of eye and ear, both what they half create,
And what perceive; well pleased to recognise
In nature and the language of the sense,
The anchor of my purest thoughts, the nurse,
The guide, the guardian of my heart, and soul
Of all my moral being.
Nor perchance,
If I were not thus taught, should I the more
Suffer my genial spirits to decay:
For thou art with me, here, upon the banks
Of this fair river; thou, my dearest Friend,
My dear, dear Friend, and in thy voice I catch
The language of my former heart, and read
My former pleasures in the shooting lights
Of thy wild eyes. Oh! yet a little while
May I behold in thee what I was once,
My dear, dear Sister! and this prayer I make,
Knowing that Nature never did betray
The heart that loved her; 'tis her privilege,
Through all the years of this our life, to lead
From joy to joy: for she can so inform
The mind that is within us, so impress
With quietness and beauty, and so feed
With lofty thoughts, that neither evil tongues,
Rash judgments, nor the sneers of selfish men,
Nor greetings where no kindness is, nor all
The dreary intercourse of daily life,
Shall e'er prevail against us, or disturb
Our cheerful faith, that all which we behold
Is full of blessings. Therefore let the moon
Shine on thee in thy solitary walk;
And let the misty mountain winds be free
To blow against thee: and, in after years,
When these wild ecstacies shall be matured
Into a sober pleasure, when thy mind
Shall be a mansion for all lovely forms,
Thy memory be as a dwelling-place
For all sweet sounds and harmonies; oh! then,
If solitude, or fear, or pain, or grief,
Should be thy portion, with what healing thoughts
Of tender joy wilt thou remember me,
And these my exhortations! Nor, perchance,
If I should be where I no more can hear
Thy voice, nor catch from thy wild eyes these gleams
Of past existence, wilt thou then forget
That on the banks of this delightful stream

* The river is not affected by the tides a few miles above Tintern.

We stood together; and that I, so long
A worshipper of Nature, hither came
Unwearied in that service: rather say
With warmer love, oh! with far deeper zeal
Of holier love. Nor wilt thou then forget,
That after many wanderings, many years
Of absence, these steep woods and lofty cliffs,
And this green pastoral landscape, were to me
More dear, both for themselves and for thy sake!

WORDSWORTH.

THE MOON.—No. 4.—(*Concluded.*)

THE average of a large number of observations, independently of the power which it gives us to detect laws unseen in the individual measurements, has also the advantage of destroying, in a great degree, the effect of errors of observation. The reason is obvious: let the instruments be ever so good, and the observer ever so attentive, each single measurement will be larger or smaller than the truth; and so long as there is no reason in the observer himself why he should commit a mistake rather on one side than the other, it is very unlikely that the sum of the defects in a great number of observations should differ much from the sum of the excesses. And whatever difference there may be, it is divided by the whole number of observations in taking the average.

The very allowable supposition here made is fully borne out by the whole history of astronomical observation. In the average of a large number of observations, all irregularity, if not destroyed, is detected, and its cause looked for, and in most instances discovered. For example, it is understood that at the Observatory of Greenwich the results of the transits of stars taken by different observers, all reductions being made, exhibit a slight difference, those of one particular observer being generally a little greater than those of another. The operation performed is simply noting the exact time by a clock at which a star passes over each of a succession of *wires* (thin spider's webs) seen in the telescope, and a practised observer generally makes an attempt to estimate each time noted by him, within one-tenth of a second. Each transit is the average of five such wires; so that whatever the total number of transits may be, taken by each observer, five times as many transits will have been taken at single wires. The average difference above mentioned is, we believe, not more than three-tenths of a second.

Now since an error of two-tenths of a second on one side or the other is possible at each wire, and generally some error does take place, we see the effect of a large number of observations in separating *uniform* from *accidental* errors, and detecting the former, even when accompanied by others nearly as large of the latter kind. We have introduced this instance to give the reader an idea of this principle, that small differences, though they tell nothing in single observations, are not to be neglected when they are found in the average of a great number; and the greater the number, the greater is the probability that a difference between two sets of observations arises from some definite and discoverable cause. If there be one instrument of which, more than of another, the indications appear to be capricious, and regulated by no law, it is the barometer. Nevertheless, it is found that the average height of the barometer is nearly the same in different years at the same place, and even in the same months of different years. In general, also, a low state of the barometer indicates rain: and this, though not by any means always true, is yet so far so, that of two large numbers of days in the first of which the barometer is, on the average, lower than in the second, it may be confidently expected that the first will contain more rainy days than the second. We shall now resume M. Arago's paper.

The following barometric observations were made by M. Flaugergues, at Viviers, from 1808 to 1828. They were made at noon, in order that, by choosing the same position of the sun throughout, the effect of the sun, if any, might not be mixed up with that of the moon. The observed heights of the barometer were then reduced to what they would have been if the mercury had been of the freezing temperature: so that all accidental variations of temperature produce no effect on the result. The heights are in *millimetres*, each millimetre being about one-twenty-fifth, or more correctly ·039371 of an inch.

Day of	Average Height.	Day of	Average Height.
	mm.		mm.
New moon......	755·48	Full moon	755·30
First octant.....	755·44	Third octant	755·69
First quarter	755·40	Second quarter....	756·23
Second octant ...	754·79	Fourth octant.....	755.50

These results, though near to each other, are much beyond what could arise from errors of observation; the greatest difference between them being about a millimetre and a half—a mistake which could not be made by a careful observer even in a single observation, far less in the average of a large number. From this table we find that the barometer is lowest on the average at the second octant, and highest at the second quarter—a result which agrees with that of M. Schübler, given in our last Number, namely, that there is most rain at the octant, and least at the second quarter.

M. Flaugergues has also confirmed the results of M. Schübler in another point. He has found that the average height of the barometer on those days when the moon is farthest from the earth, is $755^{mm}\cdot73$; while on the days on which the moon is nearest to the earth, it is $754^{mm}\cdot73$; the difference being exactly 1^{mm}. M. Schübler's result is, that it rains less on the former days than on the latter.

But we have yet two striking results in corroboration of those of the table already cited. From the table of M. Flaugergues, just given, we find the average height at the quarters to be $755^{mm}\cdot81$, and that of the heights of the new and full moon to be $755^{mm}\cdot39$; the difference being $0^{mm}\cdot42$, or 42 hundredths of a millimetre. From a long series of observations made at Padua by the Marquis Poleni, it appeared that the mean height at the quarters exceeded that at the new and full moon by $0^{mm}\cdot46$, or 46 hundredths of a millimetre; and from observations made by M. Bouvard at Paris, it appears that there the average at the quarters still exceeds that at the new and full moon, but by a greater quantity, viz., 69 hundredths of a millimetre. All these results were obtained from long series of observations; but from some observations made during a *single* year at Santa Fé de Bogota, they were, as would have appeared beforehand highly probable, confirmed in some points and not in others. The barometer was highest at the last quarter, but the average height of the quarters was *less* than that at the new and full moon.

With these facts before us, we cannot avoid coming to the conclusion, that the average state of the weather as well as of the barometer, for different times of the lunar month, exhibits variations which cannot be accounted for as the effect of accident or errors of observation. *Accidents* there are none; and when we say that an event is accidental, we mean that its connexion with other events is unobserved or unknown, not *unexisting*. Errors of observation could not give such uniform and corresponding results, from different observers, in different places and at different times, looking at different phenomena. The barometrical observations are far more convincing than those of the number of rainy days, since the height of the barometer is capable of mathematical measurement, while the definition of a rainy day depends in some degree upon the observer's judgment. It must also

be observed, that there is nothing in the above observations which presents any remarkable phenomena at the *changes* of the moon. It is true that the days of those changes were chosen for the periods of observation, not only because they have definite names, and are more commonly known than the other days of the lunar month, but also because there are considerations which render it probable that if the barometer vary its average height with the moon, the greatest, and therefore most easily observable variation, would take place at or near one of these changes. The popular opinion is, that changes of weather are always, or nearly always, to be expected at the change of the moon, particularly at the new and full. What is meant by a *change of weather* is very uncertain, so that any one can deceive himself and others by calling attention to every remarkable change which really does happen to take place at these periods, while it will be hard if, in the forty-eight hours next following a change, something does not take place, in the shape of wind, rain, or sunshine, sufficient to keep the theory in countenance, and its advocates in conceit of it.

The first set of observations cited by M. Arago on this subject, are those of M. Toaldo, at Padua, continued through nearly half a century. Their result is apparently highly favourable to the popular opinion. The observer himself was strongly biassed in favour of the common theory; and even went further, for he says that every one is aware, from his own experience, that the nails and hair grow much more quickly when cut during the increase of the moon, than when cut during the wane! The following is the result of his observations.

Epoch.	Proportion of such epochs at which changes take place.		
New moon	6	out of	7
Full moon	5	"	6
First quarter	2	"	3
Second quarter	2	"	3
Moon nearest to earth	5	"	6
Moon farthest from earth	4	"	5

If this were a real representation of the facts which occurred, and if M. Toaldo had clearly explained what constituted a change of weather in his opinion, there can be no doubt that the matter would be rightly considered as settled in favour of the common opinion. But M. Toaldo presumes and applies a theory in the formation of his observations. Supposing that the new and full moon exercise a particular influence superior to any other phases, he counts any change which happened either the day before or after those epochs, and puts it down as happening *at* the full or new moon; he sometimes reckons two days before and after the phase in the same way. On the other hand, at the quarters, which he imagined to have less influence on the weather, he counts only what happened in the twenty-four hours in which the phase occurred; that is, he gives the full and new moon always three and sometimes five days in which to catch a change of weather, and only one to the quarters. It yet remains to be seen whether, if he had given the latter five or three days and the former only one, his results would not have been exactly reversed.

Another opinion of M. Toaldo, that the quantity of rain which falls in any period of nine years is the same as that in any other similar period, or nearly so, is shown by M. Arago not to agree even with the results of his own tables, and not at all with observations made at Paris.

But the observations of M. Toaldo are directly contradicted by those of others, of whom M. Arago cites M. Pilgram and Dr. Horsley. The former made twenty-five years of observations at Vienna, from 1763 to 1787, and his results are as follows, the first column specifying the phase, and the number in the second showing how often *per cent.* that phase was accompanied by change of weather:—

1. New moon	58
2. Full moon	63
3. Quarters	63
4. Moon nearest to earth (generally)	72
5. Moon farthest from earth (do.)	64
6. Moon nearest to earth at new moon	80
7. Moon farthest from earth at new moon	64
8. Moon nearest to earth at full moon	81
9. Moon farthest from earth at full moon	68

From these observations we should imagine that fewer changes take place at the new moon than at any other phase, and that there are as many changes at full moon as at the quarters, which is directly in opposition to the results of M. Toaldo. M. Arago, not having the original work of Pilgram before him, could not say anything of his method of observing, or of his definition of a change of weather. He therefore examines the preceding results to see if they be consistent with one another; and here he immediately finds a remarkable inconsistency. If we take the preceding table as proving that the place of the moon affects the weather, it is clear we must say that, *cæteris paribus*, the farther the moon is from the earth the less that action is. (Compare 4 and 5, 6 and 8, 7 and 9.) We must therefore conclude that the least action of the *full* moon gives 68 *per cent.* (see 9) for the number of changes, for this is the number it would give in the most unfavourable circumstance. But it appears (see 2) that the whole action of the full moon gives 63 per cent. of changes,—that is, all the full moons together, on the average, indicate less action than that indicated by a selection of the most unfavourable cases only. This appears to us to prove, either that the observations were badly made, or that the connexion of the phases of the moon with changes of weather is, if any, of so trivial a nature, that twenty-five years of observation are not sufficient to detect and separate the effect of the moon from that of other causes.

The observations of Dr. Horsley, though only for two years, 1774 and 1775, yet exhibit results very little indicative of any truth in the common notion. In 1774, *two* new moons only, and *not one* full moon, were accompanied with changes of weather. In 1775, four new moons, and three full moons only, took place at a change.

M. Arago ends by some account of various notions which have prevailed with regard to lunar influence. For example, that if the horns of the moon be sharp on the third day, the month will be fine; if the upper horn of the moon appears dusky at setting, it will rain during the wane of the moon; if the lower horn, it will rain before the full; if the centre, it will rain at the full moon; if shadows be not visible from the moonlight when it is four days old, there will be bad weather. It has been thought, also, that the April moon has considerable influence on vegetation; and that if trees are cut down during the increase of the moon, the wood will not keep. The old forest laws of France forbid the cutting of wood, except during the wane of the moon, for this reason; and M. de St. Hilaire found the same idea among the natives of Brazil. The Italian wine-makers are of opinion that wine made during two moons, that is, one month and part of another, will not be good. It has been said that moonlight renders substances moist and promotes putrefaction. This is in one sense true, since moonlight nights, that is, *clear* nights, are more favourable than others for the formation of dew, and moist substances decay sooner than dry ones.

The influence, or the supposed influence, of the moon on the human body, and how long it has retained its place in our almanacs, are well known. M. Arago cites several cases in which that planet is said to have produced singular effects. For example, Ramazzini, an Italian physician, stated that in 1693 many persons who were attacked by an epidemic disorder died at the exact time of an eclipse of the moon. This is very possible;

nor is it at all to be wondered at, that imagination might produce such effects in an age when people of the highest rank would shut themselves up in a dark room during an eclipse, by the advice of their physicians, to escape from some supposed evil influence.

Our limits prevent us from giving any more instances. We hope what we have said may help to draw a distinction in the minds of some of our readers between facts established by attentive observation, and the relics of an absurd system of philosophizing.

THE SECRETARY BIRD.



THIS singular bird, with the legs of a crane and the head of an eagle, of which a characteristic representation is given in the above wood-cut, is an inhabitant of the southern parts of Africa. His presence there is a peculiar blessing to the natives; for they are indebted to him for the destruction of a vast quantity of insects and reptiles, whose multiplication, unless their numbers were thus kept down, would be a formidable calamity. The bird has been called by the names of secretary, messenger, archer, and lastly serpent-eater. The latter name truly indicates his habits;—the former are mere fanciful appellations. The first is derived from an imaginary resemblance of the bunch of long feathers that hang loose on the back of his head, to a pen stuck in the ear of a writer; the second refers to his rapid strides; and the third to a habit which he possesses of throwing straws with his beak something in the manner of an arrow from a bow. He is still best known by the name of the Secretary.

The Secretary belongs to the class of rapacious birds, and he is now placed by naturalists between the vultures and eagles. He was formerly classed among the wading birds, on account of the length of his legs. His conformation, as well as his habits, attest the correctness of the more recent classification. The Secretaries, like the other large birds of prey, build their nests on the tops of the highest trees. They seek their food both on the dry sands and the pestiferous marshes. On the one they find serpents and lizards; in the other tortoises and large insects. Their mode of destroying life is very curious, for they always kill their prey before swallowing it. Whether the Secretary meet with a serpent or a tortoise, he invariably crushes it under the sole of his foot; and such is the skill and force with which he gives the blow, that it is very rarely that a serpent of an inch or more in diameter survives the first stroke. When he meets with a serpent that is large enough to oppose a long resistance to him, he flies off with his prey in his beak to a great height, and then dropping it, follows it in its descent with wonderful rapidity, so as to be ready to strike it when it falls stunned on the ground. M. le Vaillant describes an obstinate battle between a secretary and a large serpent, in which the bird struck his enemy with the bony protuberance of his wing; but the mode of crushing with his foot is the more common.

The male and female equally labour in the construction of their large nest, in which the female generally lays two eggs. Their unions do not take place till after the most obstinate battles amongst the males. In general these birds exhibit no fierceness, and they are easily domesticated. Their natural habits must be of singular advantage to man in places where reptiles abound; and for this reason the French have endeavoured to establish the Secretary in their colonies of Guadeloupe and Martinique.

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THE GREAT NORTH ROAD.



[Findhorn Suspension Bridge.]

Our island, it is true, still "stands where it did" a century ago; but in almost all other respects it is as much changed since then as an old house that had been almost wholly rebuilt. All our accommodations within "this little world" are metamorphosed since the days of our fathers and grandfathers. Turn to which side we may, where shall we find things in anything like the same state in which they were even sixty years since? All commodities consumed, it may almost be said without exception by all classes of the people, are of improved manufacture and better quality. Look to the clothing that is now worn, by men and women, even of the poorest order of our population; nearly every article of it is of a quality such as formerly was not generally used even by the most opulent. The same thing is true of their food. Throughout England, at least, inferior substitutes for bread made of wheaten flour are now nearly everywhere discarded;—the people will live upon nothing, or at least will take nothing for the main basis of their subsistence, except that best and costliest of all the generally cultivated productions of the earth. Other articles of consumption, again, such as tea, for example, and sugar, have, from being the luxuries of the few, become almost universal necessaries. The houses inhabited by persons of every degree are equally changed and improved. So is every article of furniture, everything intended either for use or for ornament, which they contain. It would be an endless task to attempt to enumerate the many things which but a generation ago were rare, and are now possessed, in greater or smaller measure, almost by every body; the many other things that were then hardly ever seen, and are now common and plentiful everywhere; and the many others still that absolutely did not exist then, and are now enjoyed either by the whole community or by a large portion of it.

But that which lies at the root and beginning of all these things, and is indeed the foundation of a country's civilization, is a system of good roads. Without this the national resources and energies remain, in nearly their sum total, unawakened and useless. Roads are the veins and arteries by means of which the circulation of the social body is carried on. Where they do not exist, there can hardly be said to be a community. The people have nothing in common. They are not one people in anything but the name. No commerce, nor intercourse of any kind, mixes them up together into one mass. The inhabitants of a country entirely without roads would, of necessity, be savages.

No country on the face of the earth is so well provided with roads as our own; and that is one of the chief of the causes which place this country, beyond all rational dispute, at the head of the civilization of the world The greater part of England is now intersected in all

directions, not only by paths by which persons may pass on foot from one place to another, but by broad highways for the movement of wheel-carriages, and the transference of the heaviest loads that can be dragged by the power of horses or of machinery. Formerly vehicles drawn along the public roads were not allowed to carry above a very small weight. In 1629, Charles I. issued a proclamation commanding that no common carrier, or other person whatsoever, should travel with any wain, cart, or carriage, with more than two wheels, nor with a load of above twenty hundredweight, for fear of injuring the roads; and penalties continued to be exacted under this regulation for many years after. Our present roads, as compared with those which then existed, are not more multiplied than they are improved in quality. Of their number and extent, the latest complete account which has appeared is that given in the Appendix to the Report of a Select Committee of the House of Commons which sat on the subject of turnpike-roads and highways in 1820. From this document it appears that the length of all the paved streets and turnpikes in England and Wales was then 17,725 miles, and that of other public highways 95,104 miles, making the total length of travelling road 114,829 miles. Assuming all the turnpike-roads to be of the statutable breadth of 60 feet, and the others on an average 30 feet broad, the space covered by the whole would be not less than 482,000 acres, or about 752 square miles. In the years 1812, 1813, and 1814, (the latest for which there are any returns,) this extent of road was kept in repair at an annual expense of £1,404,842, being at the rate of £12 6*s*. 8*d*. per mile. But notwithstanding all that has already been done in this way, the business of opening additional lines of road is constantly going forward. Some idea of the rate at which this species of improvement proceeds may be gathered from the fact, that in the six years from 1827 to 1832 inclusive, the number of acts of parliament which were passed for the formation of new, and the repair or alteration of old roads, amounted to 388, or nearly 65 on an average per annum.

If the whole surface streaked and cut into by these roads, and our other channels of communication, could be taken in by the eye at once, what an extraordinary display of national enterprise and national wealth it would present! So large an accumulation of the conquests of energy and the constituent elements of riches, it may be safely said, was never before collected within the same compass. These roads are often the noblest exemplifications of art subjugating and triumphing over the opposition of natural difficulties. Many of them are carried through the air over considerable rivers by bridges of more or less cost and magnificence. Others are supported across depths and hollows on stupendous embankments. Some are driven underground through mountains. Some terminate in piers that extend far into the sea. There is no hostile force that their daring engineers have not faced and vanquished. And then to our common highways are to be added our rail-roads, and canals, and rivers made navigable, or otherwise improved by art, as all entering into the aggregate of those channels of communication which our ancestors and ourselves have created, and which contribute in so eminent a degree to make England what it is.

The advantages, however, which we thus enjoy are, in by far the greater part, only of comparatively recent acquisition. The Baron Dupin, in the introduction to his work on the "Commercial Power of Great Britain," writing in 1822, remarks, that fifty years before that time, France was generally as far ahead of this country in all that concerns public utility, as we had since got before his own countrymen. Imperfectly supplied with roads as France now is, compared with England, the Baron's statement is probably true if confined even to this particular. If we turn back at least to times somewhat, though not very much, more remote, we find that there were hardly any roads on which travelling could be conveniently performed, except in the immediate vicinity of the capital, and not even always there. In the Appendix to the "Results of Machinery," a passage is quoted from an historical work, according to which it appears that Prince George of Denmark, having, in December, 1703, to make the journey from Windsor to Petworth, was fourteen hours in accomplishing that distance of forty miles in his coach, the last nine miles having taken six hours to get over them. "We did not get out of the coaches," says the narrator, one of the prince's attendants, ("save only when we were overturned, or stuck fast in the mire) till we arrived at our journey's end. * * * We were thrown but once indeed in going, but our coach, which was the leading one, and his highness's body-coach, would have suffered very much, if the nimble boors of Sussex had not frequently poised it, or supported it with their shoulders." In those days, indeed, and long after, the common mode of travelling was on horseback; and in country parts goods were almost universally conveyed on packhorses. We gave, in our 61st Number, a relation extracted from Dr. Cleland's "Statistical Account of Glasgow," of a journey made in this manner by two inhabitants of that city to London, in the year 1739, in which it is stated, that they found no turnpike road till they came to Grantham, in Lincolnshire, 110 miles from the English metropolis. Up to that point they had to make their way along a narrow path raised in the middle of an unmade soft road, into which latter they had to descend whenever they met one of the gangs of packhorses carrying goods, the raised causeway not being broad enough to allow the two parties to pass each other. "We, who, in this age, are accustomed to roll along our hard and even roads at the rate of eight or nine miles an hour," says a writer in the Quarterly Review (xxxi. 356) with much truth, "can hardly imagine the inconveniences which beset our great grandfathers when they had to undertake a journey—forcing their way through deep miry lanes; fording swollen rivers; obliged to halt for days together when the 'waters were out;' and then crawling along at a pace of two or three miles an hour, in constant fear of being set fast in some deep quagmire, of being overturned, breaking down, or swept away by a sudden inundation."

The Romans formed several excellent roads in Britain, as they did in every other country which they subjected to their arms; but the ages of confusion and misery that followed their departure from the island obliterated these, with nearly every other vestige of their domination. For a long period, instead of our roads being improved, they probably continued to grow worse and worse. About the time of the Norman Conquest, the principal streets of London appear to have been little better than ditches or marshes. It is related that in the year 1090, on occasion of a storm of wind blowing down the roof of St. Mary-le-Bow church in Cheapside, four of the rafters, each twenty-six feet long, were pitched so deep into the street, that scarcely four feet of them remained above ground. Holborn was not paved till the beginning of the fifteenth century. In the year 1417, the king, Henry V., ordered two vessels, each of twenty tons burden, to be employed at his expense in bringing stones for this purpose, by reason that the highway in question was so deep and miry, that many perils and hazards were thereby occasioned, both to the king's carriages passing that way, and to those of his subjects. The western end of Holborn, however, appears not to have been paved till 1541; in which year, both it, Gray's Inn-lane, Chancery-lane, and other streets now in the heart of the city, are described as

"very foul, and full of pits and sloughs, very perilous and noisôme, as well for the king's subjects on horseback, as on foot, and with carriages."

The first notice which has been discovered of the collection of a toll for the repair of roads in England, occurs in the year 1346, in the reign of Edward III. In that year it was ordered, that tolls should be exacted, for two years to come, from all carriages passing along Holborn, Gray's Inn-lane, and the highway called Charing, "which roads," says the commission, "are, by the frequent passage of carts, wains, and horses, to and from London, become so miry and deep as to be almost impassable."

As for the country roads, little or no attention seems to have been paid to them till towards the middle of the sixteenth century. In the course of the reign of Henry VIII., four statutes connected with this subject were passed; two for altering certain roads in the Weald of Kent, and in Sussex; a third for mending a lane near the city of Chester; and a fourth for the repair of bridges. The first general act for keeping the roads in repair was passed in 1555, in the reign of Mary. It imposed that duty upon the parishes, and was followed by many others to the same effect in the reigns of Elizabeth and James I. The first toll-bar was erected in 1663, on the northern road leading through Hertfordshire, Cambridgeshire, and Huntingdonshire; "which road," says the act, "was then become very bad, by means of the great loads of barley, malt, &c., brought weekly to Ware in waggons and carts, and from thence conveyed by water to London." Three toll-gates were erected, one for each of the above-named counties; and it is said that the people were so prejudiced aga nst the innovation, that they rose in a mob and destroyed them.

Coaches are said to have been first introduced into England in 1580, by the Earl of Arundel; and by the commencement of the next century they had become common in London. They were brought to Edinburgh in the suite of the English ambassador in 1598. The historians of that city tell us, that coaches for the use of the public generally were established there in 1610. Hackney coaches were first introduced in London in 1625.

As yet there was but little intercourse between these two capitals. In London, Scotland and Edinburgh were considered as foreign parts. In 1635 a proclamation was issued by Charles I. to the effect, that, "whereas to this time there hath been no certain intercourse between the kingdoms of England and Scotland, his majesty now commands his postmaster of England for foreign parts to settle a running post or two, to run night and day, between Edinburgh and London." It was a considerable time after the commencement of the last century, before there was more than one despatch of letters in the week from London to Scotland. In the year 1763, the London coach set off from Edinburgh only once in the month, and was from twelve to sixteen days on the road. The vehicle which accomplished this adventurous achievement was at that time the only stage-coach in the northern capital, except two which ran to the neighbouring port of Leith. A journey to or from Edinburgh was in those days a doubtful and hazardous expedition — something like setting out in quest of the North-west Passage. It is said, that in Scotland, when a person determined upon attempting the achievement, he used, with the laudable prudence of that country, to make his will before setting out.

The change that has since taken place is immense. The journey between London and Edinburgh is now performed by the mail-coach, at all seasons and in all weathers, in little more than forty-three hours and a half. The person who undertakes it exposes himself to scarcely any more danger than he does when he walks along the street in which he lives. Even in Scotland a man seldom now thinks of making his will merely because he is about to visit London. These changes, and the countless others of which they are examples or indications, are due to the existence of a good road between the two capitals. This road, more than the compact of the year 1707 is the true Union of the Kingdoms.

Within the last thirty years this Great North Road, as it is commonly called, has been extended to the remotest extremity of the island—to a point still farther beyond Edinburgh (at least by the line taken) than Edinburgh is distant from London. This latter portion especially, and also parts of that extending to the south of Edinburgh, have recently undergone some material alterations and improvements. Those that have been effected within the last three years alone are well fitted to raise the admiration of all who are qualified to appreciate their importance. They afford an evidence which is extremely gratifying of the exertions that continue to be made in order to uphold and extend one of the chief foundations of our national prosperity and greatness. We have been fortunate enough to obtain very complete accounts of the principal of these improvements, in most instances from persons having access to the best sources of information; and abstracts of these we now propose to lay before our readers, accompanied with illustrative wood-cuts, and interspersed with such explanations as may convey a full and correct view of the whole course of this great highway,—the longest continued line of road in the United Kingdom.

Improvements in the North.

So greatly does the northern portion of our island incline or lean over to the west, that Edinburgh, while it is about 320 miles to the north of London, is also above 100 miles to the west of it—although the two capitals stand at about equal distances from the east coast. Edinburgh, on the east coast of Great Britain, is, in fact, rather farther west than Liverpool, which stands on the west coast. What is called the Great North Road from London, therefore, diverges considerably from a line drawn due north. The wide level country which generally prevails as far as to the heart of Yorkshire enables it to pursue up to that point a course nearly perfectly straight. The first formidable obstacle, indeed, which it meets with to prevent it from following the shortest line to the Scottish metropolis is interposed by the Cheviot hills, which form the north-west boundary of Northumberland. These hills, at their northern extremity, approach so close to the sea as to leave only a pass of a few miles broad through which the road at this part of its course can be carried. Hitherto the town of Berwick, which is on the coast, and at a short distance beyond the termination of the Cheviot range, has been assumed as the point which should determine the direction of the first part of the road between the two capitals. This has made the deflection of the line to the west less than it otherwise would have been; for Berwick, although far west of London, is still considerably to the east of Edinburgh.

The direction of the southern portion of this road, then, may be considered as necessarily regulated, not by the relative positions of London and Edinburgh, but of London and Berwick, or another point but a few miles to the westward of the latter town. The route followed by the mail at present, in fact, is very nearly the shortest line between London and Berwick, subject merely to such slight deviations as are required in order to make it touch certain great towns. The length of this portion of the road, which passes through Huntingdon, Stamford, Doncaster, York, Darlington, Durham, and Newcastle, is 342 miles; the whole distance from London to Edinburgh being 399 miles.

The first improvements which it falls within the plan of the present article to notice are those which have been recently made on the northern portion of this line of road between London and Berwick. We shall begin by merely adverting to the magnificent approaches which now lead to the town of Durham, the elevated situation of which formerly rendered it of such difficult access. The new entrances, which have in a great degree overcome the obstacles presented by the nature of the ground, are excellent specimens of engineering skill, and do honour to the local trusts. They would probably, however, have remained unexecuted, but for the stimulus given to these bodies by a Committee of the House of Commons, which had under its consideration the defective state of the communication between London and Edinburgh. We may here also mention, as having originated in the recommendations of the same Committee, the handsome new bridge over the North Tyne at Morpeth, constructed by Mr. Telford, after the model of the bridge of Neuilly near Paris.

But the most important improvements in this quarter, and those to which we would particularly direct attention, are the alterations which have recently been effected, or are in progress of execution, on the portion of the road to Edinburgh immediately beyond Morpeth. Here the Cheviot hills run almost parallel to the coast, to which they at the same time approach so closely, that what we may call their roots stretch across the intervening space in the shape of so many successive elevations, while the hollows between are occupied by rivers more or less considerable, all having a direction at right angles to the line of the road. This extreme inequality of surface has hitherto, as already intimated, forced the road close upon the sea; but even while thus retiring as far as possible from the mountains, it has still not been able to avoid a remarkably steep ridge called Birnside Moor. The gentlemen of Northumberland, however, have at last, aided by the great exertions of Sir John Marjoribanks of Lees, effected the union of several of the local trusts into one, and thereby enabled themselves to raise the sum of £12,000, which they are now in the course of expending in carrying the road through a series of valleys lying farther to the west, in place of this elevated moorland. The whole of this improvement will be completed during the present year; and, although much still remains to be done to make the road what it ought to be in the more immediate vicinity of Morpeth, the alteration effected here will deserve to be accounted one of the most valuable works of public utility which have been recently accomplished in these islands.

The road, following the new direction thus given to it, will now leave Berwick to the right, and, instead of running along the coast, as it does at present, by Dunbar, and thence turning round in a due west direction by Haddington, will proceed by Wooler and Coldstream in very nearly a straight line to Edinburgh. The saving by this route, we believe, will be above ten miles, the distance from Edinburgh to Morpeth being reduced from 104 miles to about 93½. It is only lately, however, that the road by Coldstream, which passes through a very hilly country, has been brought to such a condition as that the mail could travel on it. The exertions of the gentlemen of Berwickshire and Midlothian, by which this important object has been at last accomplished, rather preceded those of the Northumberland trustees to which we have just adverted; their operations having commenced in January, 1828.

From a report now before us, by the clerks of the Berwickshire trust, it appears that the improvements effected on what is called the Greenlaw Turnpike Road embrace the reduction of numerous severe pulls of from one foot in six to one foot in twelve, occurring between Deanburn, the northern extremity of the trust, and Coldstream, to gentle ascents of from one foot in twenty-five to one foot in forty; besides the repair of the bridge over the Blackadder, at the east end of Greenlaw, and of that over the Tweed at the east end of Coldstream. Including £2,100, expended on the Coldstream Bridge, the whole cost of these improvements, up to the 8th of March last, had amounted only to £23,145. Of the adjoining portion of the road in the Edinburgh direction, which is under the care of the trustees of the Dalkeith district, a line of about eight miles, extending from the south-east boundary of the county of Mid Lothian to the north end of Fordel Bank, near Dalkeith, has within the same period been shortened, and the passage on it rendered much more safe and easy by altering the course of the road in some places, by cutting down and banking over some difficult and dangerous passes, and by building several new bridges.

The principal bridges are, the bridge over Cranstown Dean, and the bridge over the Tyne, at the north end of the village of Ford Pathhead, called the Lothian Bridge. Cranstown Dean Bridge is forty-six feet in height, and consists of three semicircular arches of seventeen feet span: the whole building is of ashler; and the piers being only three feet in thickness, the bridge has a very light appearance.

Lothian bridge is eighty-two feet in height, and consists of five semicircular arches of fifty feet span, surmounted by ten segment arches of fifty-four feet span and eight feet of rise. The piers are eight feet thick by twenty-eight feet broad, and hollow in the centre, as are also the abutments.

The whole building is of ashler, thereby presenting a happy combination of durability and lightness, and adding much to the ornament of the adjoining grounds. The embankments at the ends of the bridges are planted up with evergreens.

Of the embankments, that at Cotterburn is of the length of 500 yards, and will contain 200,000 cubical yards of earth. The extreme depth of cutting in the line of the road will be thirty-two feet. Besides the general improvement of the line of road, these operations have opened many fine prospects of the neighbouring beautifully-wooded and highly-cultivated country. The expense has amounted to between £20,000 and £30,000; besides a large sum of money which was previously expended on the improvement of that part of the line which is situated between this district and Edinburgh.

The city of Edinburgh stands within two miles of the great arm of the sea called the Frith of Forth, which, at the part immediately north from the Scottish capital, is about seven or eight miles broad. Steam-boats and other vessels put across this estuary at all hours from Leith, the port of Edinburgh, and from Newhaven, about a mile to the west of that town, both to Burntisland, Pettycur, and Kinghorn, which are directly opposite, and to Kirkaldy, Dysart, Leven, Ely, Pittenweem, and Anstruther, which lie farther to the east. The common passage for travellers to the north is from Newhaven (where there is a chain pier) to Pettycur. As this passage, however, is subject to be occasionally interrupted, (though since the introduction of steam navigation that is a circumstance which has very rarely happened,) the mail, instead of crossing here, proceeds along the coast of the river to Queensferry, about twelve miles farther west, where the channel is contracted to the width of about a mile and a half. But before leaving Edinburgh we cannot help noticing, although not upon any of the great lines of road leading from that capital, the magnificent bridge, called the Dean Bridge, which has lately been thrown across the chasm formed by the river or water of Leith to the north of the city. The reader will find a notice of this structure, which was only finished about the beginning of last year, in the "Companion to the Almanac" for 1832. By permission of the publishers

of the "Encyclopædia Britannica," we present an engraving of it, taken from one of the plates in the new edition of that work. This bridge, which has been erected after a design by Mr. Telford, almost at the sole expense of John Learmouth, Esq., (late Lord Provost,) to whose property it forms a communication, consists, it will be perceived, of two series of four arches each, the one surmounting the other. The span of each of the upper arches is 96 feet; and the road-way passes at the height of more than 120 feet above the level of the water below.



[View of Dean Bridge, Edinburgh.]

From Queensferry the present route of the mail is directly north by Kinross to Perth, from which point, crossing the Tay by a bridge, it takes its way along the northern banks of that river in an eastern direction to Dundee, and from thence to Arbroath on the coast. The common road, however, from Edinburgh to Dundee runs in nearly a straight line from Pettycur through the county of Fife, and across the Frith of Tay, which at Dundee is about two miles in breadth. There is on this passage an excellent steam-boat, of a peculiar construction, the paddles being placed in the middle as if there were two boats joined, and the form being such that it moves equally well with either end foremost. The distance from Edinburgh to Dundee, by this road, is not quite 43 miles, whereas by that which the mail takes, for the sake principally of avoiding the two ferries over the Forth and the Tay, it is not less than 69 miles. From Dundee to Arbroath is 17 miles more, so that the whole distance by this circuitous route from Edinburgh to the latter place is 86 miles, the distance in a straight line being only about 50. In getting from Berwick to Arbroath, again, the mail travels about 143 miles, while a straight line drawn between these two points would not measure 60. The voyage by sea from the one place to the other does not exceed the last-mentioned distance.

The road between Edinburgh and Montrose, which is twelve miles to the north of Arbroath, has been constructed at a cost of not less than £100,000, reckoning only the outlay since the commencement of the present century; but as only a small portion of this sum has been expended within the last three or four years, the consideration of the improvements which it has effected does not fall within the scope of our present remarks. We pass on, therefore, to notice the bridge which has just been carried over the South Esk at Montrose. This town stands on the north bank of the river called the South Esk, which here falls into the German Ocean; and we cannot better explain its singular situation than by extracting the description given of it in a Report made in 1823 by Mr. Buchanan.

"The river South Esk, at Montrose, is remarkable for its broad, deep, and very rapid stream. But the great width of the river, and the current, deep and rapid beyond example indeed in this country, are not owing to the magnitude of the South Esk river itself, but to the singular manner in which the discharge of its waters into the sea is here combined with the action of the tides and the configuration of the adjacent ground.

"The town stands on a gently-rising ground, in one of those low sandy flats which occur so frequently on the shores of the German Ocean, and which, from their slight elevation above the sea level, and other circumstances, appear to have been once overflowed by the water. It has the German Ocean on the east, at the distance of about half a mile, and to the west is a tract of low and level sands, above four square miles in extent and nine miles in circumference, through which the South Esk winds its way to the sea, passing close to the town on its south side. These sands lie below the level of high water, and above the level of low water; and the river opening a communication with the sea, it necessarily happens, that every rising tide rushes up the channel of the river, and inundates the whole of this sandy flat to the west of the town, which is again left uncovered by the reflux of the tide. The channel through which this great body of water is alternately poured in and discharged, is suddenly contracted, at the south end of the

town, to the breadth of 700 feet at high water, and 400 feet at low spring tides; and in consequence of this, the stream rushes in or out with great violence, according as the tide is either flowing or ebbing. This low land, over which, at each return of the tide, are spread the waters of the ocean, after they have made their way through the narrow channel of the South Esk, is called the Basin; which forms a striking object in the scenery of the place, appearing, when the tide is full, a large and beautiful lake, and in a few hours afterwards, when the waters have retired, a desolate and sandy marsh."

Between the basin and the sea, the river is at one place divided into two channels, by a small island called the Inch; but the two streams again unite into one before they arrive at the sea. About thirty years ago, when the road from Edinburgh to Aberdeen was first constructed, a wooden bridge was erected across the most northern of these channels, which is by far the broadest; the other being crossed by a stone bridge of one arch, which is so narrow that, says Mr. Buchanan's Report, "it has contracted the channel of the river to at least one-fourth of its original breadth." At the same time the channel of the northern stream had been greatly contracted by the faulty construction of its wooden bridge. The effect of this unnatural confinement of so violent and rapid a stream has been to deepen the channel on the northern side, not less than five or six feet in many parts; so that the original bottom having been carried away, the foundations on which the piers rested were in danger of being undermined. To prevent this result wooden piles were driven in, which served as a sort of wall to repel the current. But, notwithstanding this expedient, the bridge was still found to labour under the incurable defects of its original construction. In particular the wood was so damaged by the ravages of sea worms, of the genus designated *Oniscus*, that the expense of keeping it in repair was very great. It was accordingly determined a few years ago to remove this wooden structure altogether, and to supply its place by a suspension bridge. Such a bridge has been accordingly erected, after a design by Captain Samuel Brown, of the Royal Navy. We present below an accurate sketch of it. The foundation-stone was laid on the 18th September, 1828, and the whole was completed by the 12th December, 1829.



[Bridge over the South Esk at Montrose.]

The distance between the towers at the two extremities of this bridge, measured from the centre of each, is 432 feet. The height of each tower is seventy-one feet; namely, twenty-three feet and a half from the foundation to the roadway, forty-four feet from the roadway to the top of the cornice, and three feet and a half forming the entablature. The breadth of each tower at the termination of the cutwaters is forty feet and a half, and thirty-nine and a half at the roading. The archway by which each is perforated, is sixteen feet in width, by eighteen in height. The four counter-abutments for securing the chains are respectively 115 feet distant from the towers, (reckoning from the centre of the tower to the face of the farthest wall of the chambers,) and consist each of an arched chamber, a strong counter-fort or abutment, a tunnel, and lying spandrel arch. The width of the bridge is twenty-six feet within the suspending rods. The bars of which the main chains consist measure eight feet ten inches from centre to centre of the bolt-holes, five inches broad between the shoulders, and one inch thick throughout. All the main links or bars are of the same thickness, except those in the towers, which are a sixteenth of an inch thicker, and of length to suit the curve of the cast iron saddles. Each main suspending chain, of which there are two on each side of the bridge, one over the other, placed one foot apart, consists of four lines of chain bars. The joints of the upper main chains are over the middle of the long bar in the lower chain; and the suspending rods, which support the beams on which the roadway is laid, are five feet distant from each other. The chains are of wrought cable iron; the beams are of cast iron, formed with open spaces, twenty-six feet eight inches long, ten inches deep at the neck of the tenons, and one inch thick in every part between the flanges. The whole cost has been a little above £20,000.

To this account we have only to add, that the centre of the arch of the stone bridge which crosses the southern stream has also been taken down, and a revolving drawbridge erected in its stead, by which vessels are allowed to pass and repass. The communication across the South Esk, at Montrose, therefore, may now be considered to be as perfect as it can be rendered or desired.

From Montrose the road follows the line of the coast by Bervie and Stonehaven to Aberdeen, a distance of thirty-seven miles. The situation of New Aberdeen is extremely similar to that of Montrose, standing, as it does, on the north side of the large and rapid river Dee. Until lately, the only bridge across this river was the magnificent old bridge erected by Bishop Elphinstone in the early part of the sixteenth century. Within the last three years, however, a suspension-bridge has been erected between the town, and a road made, at great expense, to communicate with the old one. Of this structure the following is a representation.

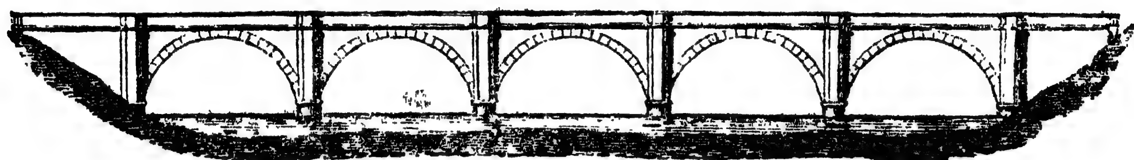


[Bridge over the Dee at Aberdeen.]

In this bridge the width between the stone piers is 200 feet; the breadth of the roadway is 22 feet; and its height above high water is 18 feet. It is within the recollection of many persons now alive, that the whole of the land at present in cultivation around Aberdeen was one brown heathery moor. Such is still the case with the whole district through which the above-mentioned new road has just been completed; but from this operation we may probably date the commencement of a course of improvements which will ere long transform this hitherto bleak and sterile tract into cultivated and productive fields. And here, while speaking of New Aberdeen, we cannot help adverting to the small expense, both of money and of time, with which, thanks to steam navigation, a person residing even at so distant a point as London may now accomplish a visit to this handsome northern city, remarkable for its rapid increase, the industry of its inhabitants, and the fine granite buildings of which it is entirely constructed. The voyage by sea is very little, if anything, longer than to Edinburgh, and is usually performed by the steam-boats in little more than fifty hours.

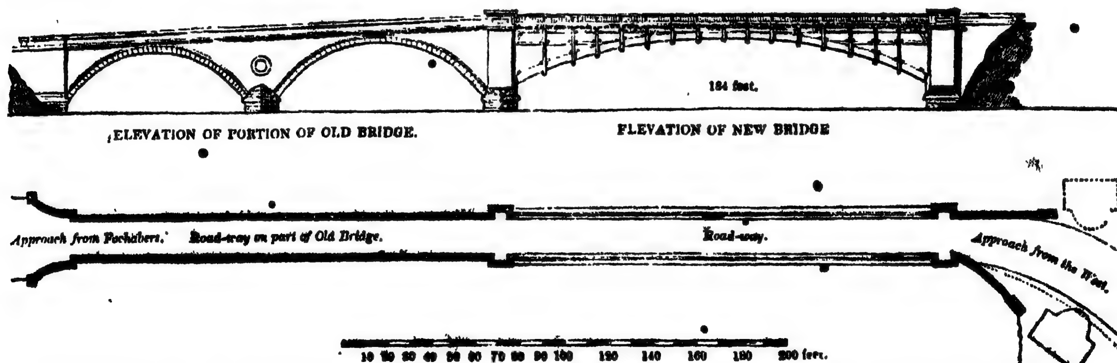
As New Aberdeen is situated on the north side of the Dee, so Old Aberdeen stands on the south side of the Don. The Don, until within these few years, was crossed at Old Aberdeen by a very ancient bridge, called the *Brig of Balgownie*. We refer the reader to an interesting passage in Sir Thomas Dick Lauder's volume, entitled "An Account of the Great Floods of August, 1829, in the Province of Moray and adjoining Districts," for some curious particulars regarding this structure.

The new bridge of Don, which was built by Mr. Gibb, after a design by Mr. Telford, is about 520 feet in length, and consists of five arches, each of seventy-five feet span, and twenty-four feet rise. The total expense of the erection was £14,000. The effect of this improvement is to shorten the road by about half a mile, and to avoid three steep hills over which it was formerly carried. This structure, although in an unfinished state when the great flood of 1829 occurred, escaped on that occasion without injury. It was completed towards the end of the following year. We give a cut of this bridge.



[Bridge over the Don at Aberdeen.]

At Aberdeen the mail road leaves the coast, and proceeds across the country in nearly a straight line by Inverury, Huntley, Keith, and Fochabers, to Elgin, the county-town of Morayshire. The whole distance from Aberdeen to Elgin is sixty-seven miles. The road is throughout excellent; and, notwithstanding that it passes over a great deal of hilly country, is so artfully conducted, that hardly a single heavy pull is encountered the whole way. Immediately beyond Fochabers it is met by the impetuous and formidable river Spey, forming the boundary of the province of Moray, which, notwithstanding its northern situation, is one of the fairest portions of the island, and one of those in which vegetation is earliest. It used, however, to be in a manner separated and cut off from the rest of the country by this dangerous mountain-torrent, until about twenty-five years ago, when a bridge was first built across it at Fochabers. It consisted of four arches, of which two were of ninety-five and two of seventy-five feet span each, the total length of water-way being 340 feet. But this bridge, during the floods of August, 1829, which destroyed or damaged nearly one hundred others, had the two arches next the left bank carried away, of which Sir Thomas Dick Lauder has given a striking account. This bridge has been since repaired, as represented below.



Various bridges over the river Findhorn, which bounds Morayshire to the west, and over the stream of the Lossie, on which the town of Elgin stands, were swept away on the same occasion; so that the country was at once cut off from all communication with surrounding parts. Active measures, however, have since been taken to repair the ruin produced by this visitation, and new bridges have already been erected in the line of the great road over all the three rivers.

The bridge at Elgin, over the Lossie, of eighty feet span, is partly of cast metal and partly of timber. We give a representation of this bridge in the next page, from a lithographic print executed at Elgin. That over the Findhorn, which is a suspension bridge, is represented at the beginning of the article.

From Elgin the mail proceeds along the coast of the Moray Frith to Inverness, and from thence westward to the termination of that estuary, when it crosses the Beauly Water, and ascends northwards to Dingwall, on the Frith of Cromarty. Pursuing for some time the direction of the northern coast of that Frith, it then arrives at Tain on the Dornoch Frith, which it crosses by Meikle Ferry; after which the road runs along the coast for seventy miles, till it leaves it at Wick, and cuts across the country to Thurso on the Northern Ocean. This is the farthest point to which the London mail proceeds. Thurso, by the road which has been described, is 788 miles distant from London; and the journey is now accomplished by the mail, all stoppages included, in four days and fifty minutes.

The portion of the road which has just been described from the Beauly Water to Thurso has been constructed and is maintained in repair by the commissioners appointed under the act of parliament for superintending Highland roads and bridges. The works conducted by the parliamentary commissioners from the year 1803, when they commenced their operations, have done more to advance the civilization of the Highlands than all the other attempts of government for that purpose in the course of the preceding century. Speaking of what had been done up to 1817, Mr. Telford, the engineer, asserts, in a statement which will be found quoted at greater length in the "Results of Machinery," chap. vii., that the money then expended "had been the means of advancing the country at least one hundred years." The report made by the commissioners in 1828 (the fourteenth) contains an interesting communication, addressed to the late Lord Colchester, by Mr. Joseph Mitchell, on the improved state of the Highlands since the commencement of the works executed by the commissioners; with an abstract of a few of the statements presented in report which we may fitly conclude the present paper.

So little communication was then wont to be between the northern counties of Scotland and the south, owing to the want of roads, that, until of late years, the counties of Sutherland and Caithness were not required to return jurors to the circuits at Inverness. "Before the commencement of the present century, no public coach, or other regular vehicle of conveyance, existed in the Highlands. It was not till 1806 and 1811 that coaches were regularly established in these directions, being the first that ran on roads in the Highlands. Since the completion of the parliamentary works, several others have successively commenced; and during the summer of last year, no less than seven different stage-coaches passed daily to and from Inverness, making forty-four coaches arriving at, and the same number departing from, that town in the course of every week. * * * Post-chaises, and other modes of travelling have, during the same period, increased proportionably and, instead of five post-chaises, which was the number kept in the town of Inverness about the year 1803, there are now upwards of a dozen, besides two establishments for the hire of gigs and riding horses. * * * The number of private carriages in Inverness and its vicinity has likewise increased remarkably during the last twenty-five years, and no less than 160 coaches may now be seen attending the Inverness yearly races; whereas, at the commencement of that period, the whole extent of the Highlands could scarcely produce a dozen; and at no very distant date previously, a four-wheeled carriage was an object of wonder and veneration to the inhabitants. In 1715, the first coach or chariot seen in Inverness is said to have been brought by the Earl of Seaforth. In 1760, the first post chaise was brought to Inverness, and was for a considerable time the only four-wheeled carriage in the district. There are at present four manufactories for carriages at Inverness."

Formerly there were no inns; inns are now built except in one instance, along all the roads constructed by the commissioners, extending in length to upwards of 900 miles. The mails, which used to be carried only on runners' backs, are now sent to all the considerable towns in coaches, and three or four times a week to places off the direct line of road, to which they used to come only once. Finally, Agriculture has received a prodigious impulse from these improvements; the value of property has been greatly increased; trade has been promoted; and the general condition of even the poorest of the inhabitants has been ameliorated by numerous accommodations and comforts which were formerly entirely out of their reach.



[Elgin Gas Works and Bishopmill Bridge, over the Lossie.]

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THE EUROTAS.



[View of the River Eurotas.]

This river is much celebrated in the ancient history of the Greeks. It ran close by the city of Sparta, and was the scene of many important events. In very early ages it was styled the river of Marathon,—then the Himere,—and, at a later period, obtained the name of Eurotas.

It rises near the source of the Alpheus, another stream of classical celebrity, in the territory of Megalopolis in Peloponnesus, (now the Morea, and a portion of the new Greek kingdom). According to Strabo and Pausanias, both the Eurotas and the Alpheus run hidden under ground for the space of some stadia*, after which they re-appear, and issue forth, the one into Laconia, and the other into what was anciently the country of the Pisæ, at the west of the Peloponnesus. Colonel Leake seems inclined to doubt more than one of the wonderful stories told of these two classical rivers. The facts he gives from his own observation are, that the Alpheus rises at the distance of five stadia from Asea, (the ruins of which city are still visible,) a short way from the road,—that the source of the Eurotas is close by the road-side, and near to the fountain of the Alpheus,—that a roofless temple, dedicated to Cybele, and two lions, cut in stone, ornament the source of the Alpheus, while the waters of the Eurotas (now, at least,) gurgle forth unhonoured by the presence of any work of art; and, finally, that the two streams uniting, flow together for twenty stadia in one bed, when they descend a chasm and separate.

A little to the south of Sparta, a romantic torrent called Pandeleimona joins the Eurotas, whose waters are besides swelled by a number of streams descending chiefly from the Taygetum, and finding their way through hollows in the chain of low hills on which the Spartan capital once stood.

On the site of Sparta, at the time of Colonel Leake's visit, there were only two small villages,—Magula, consisting of four or five huts, and Psykhiko, of fourteen or fifteen,—and even these have probably disappeared during the horrors of revolutionary and partisan warfare. All the level ground of the site was then cultivated with corn. Facing a hollow in the middle of the bank of hills on which the city stood, are the remains of a bridge over the Eurotas. At the head of this bridge the roads from all the eastern part of the Lacedemonian territory centred, and the hollow at the other end of the bridge led directly into the Agora or great public square of

* Eight stadia make an Italian, which is a little more than an English mile.

Sparta,—the general mart and the place where all public business was transacted.

The Spartan plain, the river, and the surrounding mountains, all immortalized by poetry and history, are of surpassing grandeur and beauty. They are seen to the greatest advantage from the neighbouring castle of Mistra, an important geographical position, about 500 feet above the level of the Eurotas. Colonel Leake thus describes this view:—

"The mountains to the north, east, and south, are spread before the spectator from Artemisium, on the confines of Argolis and Arcadia, to the island of Cythera inclusive, together with a small part of the Laconic gulf, just within that island. All the plain of Sparta is in view, except the south-west corner, which is concealed by a projection of Mount Taygetum. Towards the mountain the scene is equally grand, though of a different nature. A lofty summit of Taygetum, immediately behind the castle, three or four miles distant, is clothed with a forest of firs, and now deeply covered with snow; the nearer slopes of the mountain are variegated with the vineyards, corn-fields, and olive-plantations belonging to the villages situated on opposite sides of the ravine of the Pandeleimona, which winds from the southward in the direction of the highest summit of Taygetum. This remarkable peak is not much inferior to any of the highest points of the Peloponnesus, and is more conspicuous than any, from its abrupt sharpness. I cannot learn at Mistrá any modern name for Mount Taygetum, except the very common one of Aia Eliá, or Saint Elias, who, like Apollo of old, seems to delight in the protection of lofty summits."

And in another place Colonel Leake says, that the country round Sparta "presents a variety of *the sublimest and most beautiful* scenery, such as we hardly find equalled in any other part of picturesque Greece itself."

After the river Eurotas has washed the feet of the now solitary hills of Sparta, and flowed through the Spartan plain, it winds through a long, narrow valley to Helos, the city of the unfortunate Helots, and there falls into the sea between Gythium, the ancient sea-port of Sparta, of which considerable remains still exist, and Acria, another maritime place that has left no traces of its existence except some small and scattered fragments of walls, and the base of a single column.

In ancient times the Eurotas was celebrated for the number and beauty of the swans that sailed upon its tranquil waters. These graceful birds are not mentioned by modern travellers, who, however, describe another incident which characterized the old river. This is the growth, in the bed of the Eurotas, and more particularly towards its mouth, of a prodigious quantity of fine, tall, and strong reeds. The Spartans of old, whose grand object was to form a hardy fearless race, made their children go and gather these reeds with their hands, without knives or any other instrument to assist them. And these reeds worked into mats formed their only bed and bedding, or to translate the words of an old French writer, they were "the mattress, feather-bed, sheets, and coverlets of the warlike Spartans *."

This iron race of men were also accustomed to plunge their infants into the Eurotas to inure them by times to the severities of cold. These immersions must have oftentimes been *cold indeed*, for in the spring or early summer months, the bed of the river is chiefly filled by melted snow which descends from the adjacent mountains, and from the shortness of its course has not time to raise its temperature.

* The reeds of the Eurotas, which were perfectly straight, strong, and variegated in their colours, were applied to several other purposes. The Spartans made arrows of them, pens, martial fifes or flutes: of the flag or leafy part they made wreaths which they wore on their heads at some of their sober festivals.

OLD TRAVELLERS.—MARCO POLO.—No. 1.

The fame of all the old travellers, great as it deservedly is in many instances, is eclipsed by that of Marco Polo; who, however, more perhaps than any of them, was discredited by doubt and disbelief, and has only been rescued from the imputation of being the least to be credited of them all, by the discoveries and researches of our own days.

This extraordinary man descended from a noble family of Venice, which came originally from Dalmatia, on the opposite side of the Adriatic Sea. In Venice, fortunately for her, commerce was not considered incompatible with nobility of birth or antiquity of descent. There, as at Genoa her rival, the proudest and highest of the aristocracy devoted themselves to commercial pursuits; and Nicolo Polo and Maffeo Polo, the father, and the uncle of Marco, were merchants, who, in partnership, traded chiefly with the East, the valuable productions of which were supplied by the Italian republics alone to the west of Europe.

The circumstances attending Marco's birth and youth are interesting and melancholy. Tempted by the prospect of some brilliant speculations in that great mart, his father and his uncle both set out from Venice for Constantinople. His father was a traveller when young Marco came into the world; nor did he or his uncle return to their native country, until Marco, who was to be a greater traveller even than they, had attained his sixteenth year. Nor was the absence of a father's care supplied by a mother's tenderness,—his mother died shortly after giving him birth, so that he had grown up without having known either of his parents.

The causes which had led to the prolonged wanderings of the elder Poli were these:—

On their arrival at Constantinople, which was then in possession of the Franks, having been conquered some years before by a conjoint armament of French and Venetians, Nicolo and his brother disposed of the Italian merchandise they had carried thither, and looked about as to how they could best employ the capital they had realized by the sale of those goods. While doing this they learned that a new, a distant, but a promising market for costly articles which could be easily carried, had arisen on the banks of the Wolga among the Western Tartars, who, after doing incalculable mischief to many provinces of Asia and of Europe, had quietly settled and even built cities near to that river.

As soon as they were well assured of this fact, the two enterprising brothers converted their money into valuable jewels said to be in demand among the Tartars, and in the year 1254 or 1255 departed by sea from Constantinople, crossed the Euxine or Black Sea, and landed on the Crimea. Proceeding thence, sometimes by land, and at others by water, they at last reached the court or camp of the Tartar Prince Barkah, who was grandson to the great conqueror Gengis-Khan. This prince not only treated them with justice, but with high consideration and munificence. The Poli stayed twelve months with him, and learned his language. At the end of that period they would have returned homewards with the double profits they had made, but just at the moment hostilities broke out between their protectors and another nation or horde of Tartars, and cut off their road to Constantinople. On this disappointment they determined to pursue a safe but very circuitous route that led them by the head of the Caspian Sea, the river Jaxartes, and the deserts of Transoxiana to the celebrated and commercial city of Bokhara.

The brothers performed this arduous journey and reached Bokhara in safety. Whilst staying there a Tartar ambassador, on his way to Kublai-Khan, the great conqueror of China, rested at Bokhara and made their acquaintance. This noble envoy was so delighted

with their wit and intelligence, and their speaking the Tartar language, that he endeavoured to induce them to forego for the present all thoughts of home, and accompany him to Kublai-Khan's court. Their return into Europe was beset by increasing difficulties resulting from wars and revolutions—before them was a prospect of great gain and good treatment; so, accordingly, the adventurous brothers, recommending themselves to the protection of God, agreed to accompany the Tartar ambassador to what was then considered the extremity of the eastern world. Starting from Bokhara, they travelled a whole year before they reached the grand khan or emperor's residence.

Kublai, who for his race and age was a very enlightened sovereign, gave the Poli a gracious and encouraging reception. As their familiarity at court increased, in the course of long conversations with the khan they gave him ample information as to the potentates of the western world, and more particularly the pope, whose influence in propelling the hordes of Europe upon Asia, in the crusades, rendered him important in the eyes of Kublai. So satisfied was the Tartar conqueror with all they told him, and so convinced was he of their integrity, from the experience he had had of them in matters of commerce, that he resolved they should make the best of their way back to Italy, and, accompanied by an officer of his court, repair to Rome, as his ambassadors to the pope. After a long stay, they therefore took their leave of Kublai, and set out to retrace their steps to Europe. Unfortunately the Tartar nobleman who was to accompany them soon sunk under ill-health and the fatigues of the journey; and they were obliged to leave him behind: but under favour of the imperial tablet or passport *, they travelled on towards the Mediterranean, and in three years—and not sooner!—arrived at a sea-port in the kingdom of Lesser Armenia. Here they embarked, and in April, 1269, reached the famous city of Acre, then in possession of the crusaders.

The see of Rome was then vacant by the death of Clement IV., and, as was not rarely the case during the middle ages, the Sacred College was long ere it elected a new pope. Waiting until there should be a pontiff to whom they might present themselves as Kublai's ambassadors, and naturally anxious to see their home after so many years of absence, the Poli embarked in a ship bound for the Eubœa (now Negropont) and Venice. On their arrival at Venice they found that Marco was approaching the years of manhood, and that he had been well brought up. The Sacred College was distracted by inveterate factions, who could not agree in the election of a pope. After the brothers Poli had waited two years in Italy in vain for that event, they resolved to repair to the Romish legate at Acre, who might, to a certain extent, assume the functions of a pope. Accordingly they left Venice, accompanied by Marco who was now between seventeen and eighteen years old, and whose youthful imagination was inflamed by the recitals of his father's and uncle's travels to the remote regions of the East.

The legate at Acre, Tebaldo di Vicenza, listened favourably to the suggestions of the Poli, and furnished them with letters for the Tartar emperor. But scarcely had the travellers embarked at Acre when intelligence was received that the cardinals had, at last, elected a pope, who was the legate Tebaldo. The new pope sent messengers to overtake the Poli, who returned, and were soon after dismissed with letters papal of more dignified style, and the pope's benediction. Two monks were also added to their retinue as bearers of Gregory's present to Kublai, and as persons fitting to carry on the work of conversion. The friars, however, had not the zeal and courage of the merchants, for on finding that the Sultan of Egypt was invading part of the country they had to traverse, they left the Poli, and hastened back to the coast.

* Passports existed in China many centuries before they were adopted in Europe. A Chinese passport is a much better thing than a European one, as it insures the bearer gratuitous accommodation, and, generally, food on the road.

Marco and his father and uncle meanwhile struck boldly into the interior of Asia. They followed a north-easterly course, availing themselves of the protection of caravans as they occurred, and seem to have gone through the Greater Armenia, Persian Irak, Khorasan, and by the trading city of Balkh into the country of Badakhshan, where, near to the sources of the river Oxus, they tarried a whole year. This long stay may have arisen from their being obliged to wait for the formation of a powerful caravan to cross the dangerous chains of mountains—the Belut-tag and Muz-tag,—or from a severe illness young Marco suffered at this place, or, still more probably, from the union of these two causes. Their time, however, was not unprofitably spent, for though they did not visit those regions, they obtained from native travellers a knowledge of Kashmir, and other countries on the confines of India.

When they left the country of Badakhshan and the sources of the Oxus, they proceeded through the great valley then called Vokhan. After this valley their road ascended to the lofty and wild regions of Pamer and Belôr, which are still imperfectly known to geography, and which Marco describes as being so high that no birds are found on them and fire burns dully near their summits. A sign of a human habitation or a blade of grass was not seen for many days, and the district of Belôr, moreover, was infested by a tribe of cruel savages clad in the skins of wild beasts.

After fifty-two days' hard travelling in these inhospitable regions, the Poli arrived safely at the city of Kashgar, a place of great trade and resort for caravans, which had been till lately the capital of an independent state, but was now included in the spreading dominions of Kublai-Khan. Marco's description of this place, which still is, as it then was, the emporium for the trade between Tartary, India, and China, will give our readers a good notion of the concise, pithy style, in which the old Italian traveller described what he had seen.

"Its inhabitants are of the Mahometan religion. The province is extensive, and contains many towns and castles, of which Kashgar is the largest and most important. The language of the people is peculiar to themselves. They subsist by commerce and manufacture, particularly works of cotton. They have handsome gardens, orchards, and vineyards. Abundance of cotton is produced there, as well as flax and hemp. Merchants from this country travel to all parts of the world; but in truth they are a covetous, sordid race, eating badly and drinking worse. Beside the Mahometans there are among the inhabitants several Nestorian Christians, who are permitted to live under their own laws, and to have their churches. The extent of the province is five days' journey *."

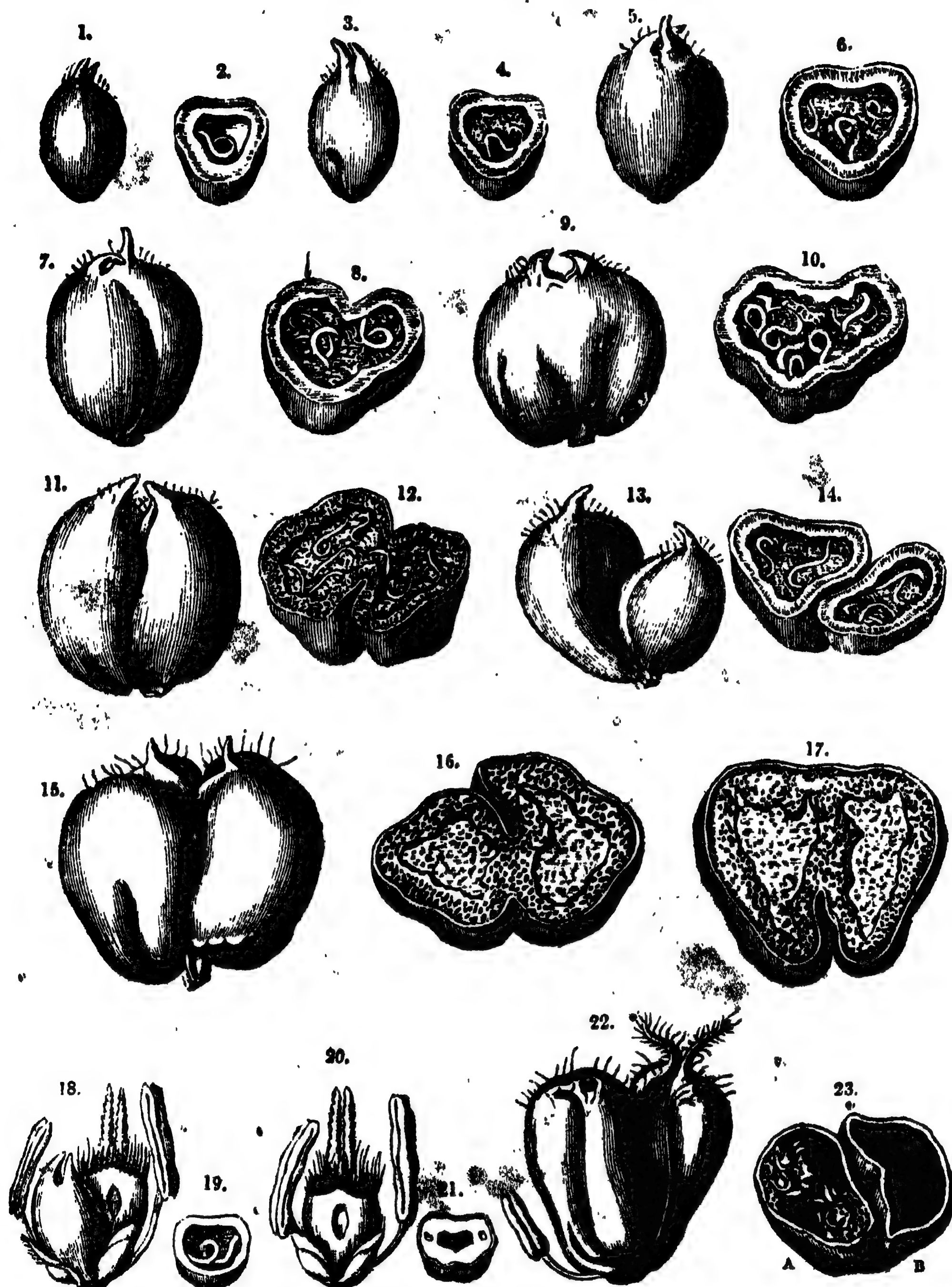
The still more celebrated city of Samarkand lay far to the west of their present route; but Marco, who it should seem visited that place at a later period when in the service of Kublai-Khan, mentions it incidentally here. On quitting Kashgar the travellers went through the Alpine regions of Yerken or Yarkund, where Marco observed that the inhabitants were afflicted with elephantiasis in their legs, and with goitres or huge swellings in their necks. He describes the inhabitants of these regions as being much addicted to trade, and as cultivating very extensively not only grain and cotton, but flax and hemp.

* Marsden's Translation.

[To be continued.]

THE GRAIN WORMS.

Table A.



[The Grain Worms—*Vibrio Tritici*.]

We have received an interesting paper upon the Grain Worms (*Vibrio Tritici*), from the correspondent who furnished the former papers on the Smut Balls, or Pepper Brand, and the Smut, or Dust Brand. As, however, it is too long for one Number, and cannot be thoroughly comprehended without the explanatory figures, we have this week given the tables, and shall in the following Number give the remainder of the communication.

Explanation of Table A.

[Each of the figures in this table are magnified 10 times in diameter or 100 times superficially.]

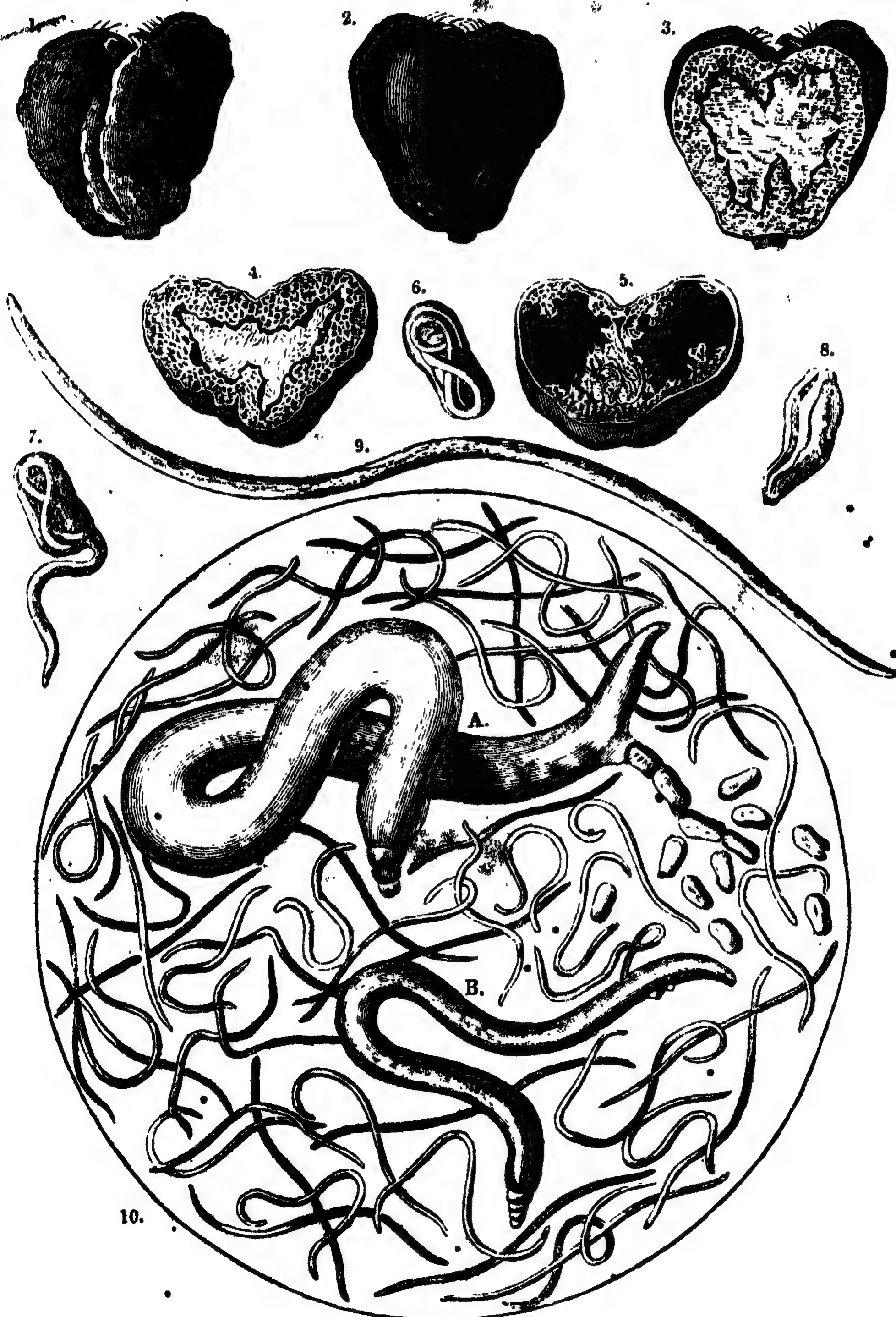
Fig.

1. A germen infected with grain worms from the apex of a wheat-ear, before it had emerged from its hose; examined the 5th of June, 1808.
2. A transverse section of the same, containing one single large worm but no eggs.
3. An infected germen from the base of the same ear.
4. A transverse section of the same, containing one large single worm and some eggs.
5. A somewhat larger germen, examined the 13th of June.
6. A transverse section of the same, containing two large worms and many eggs.
7. An infected germen, examined June the 21st.
8. A transverse section of the same, containing several large worms, many eggs, and some newly hatched lively worms.
9. A somewhat larger germen or grain, examined the 27th of June.
10. A transverse section of the same, containing several large and several young worms, and a great many eggs.
11. An infected grain, examined the 15th of July, 1808

Fig.

12. A transverse section of the same, containing seven large worms of different sizes, some laying their eggs, some not quite mature, many young worms, and a great many eggs.
13. An infected grain nearly divided into two parts, examined July the 15th.
14. A transverse section of the same containing several large worms, some laying their eggs, some already dead, a great many young live worms, and many eggs.
15. A full grown infected wheat grain, examined July the 30th, just beginning to change its colour.
16. A transverse section of the same, the cellular tissue divided into two cavities filled to excess with young worms all alive, but no trace of the old worms, nor of the eggs existed.
17. A longitudinal section of the same.
18. A double germen found in one floret of an inoculated plant, examined June the 5th, 1808; the seed corn was inoculated with worms, and one germen proved infected with worms and the other was perfectly sound, there were also two stunted anthers in that floret.
19. A transverse section of the infected germen which contained one large worm.
20. The sound germen, after the infected one was removed.
21. A transverse section of the sound germen.
22. Another double grain found in one floret of a plant the seed corn of which had been inoculated with the worms and with the fungi of the smutballs; both diseases had taken effect; examined July the 18th, 1808. One grain was found infected with worms and fungi, and the other with fungi only; there was also one small anther in this singular floret.
23. A transverse section of the same: in the germen A, are two nests or groups of worms, closely adhering to some remains of the cellular tissue; the other germen B is entirely filled with the fungi of the uredofœtida or smut balls, and has no trace of the cellular tissue.

TABLE B.



[The Grain Worms—*Vibrio Tritici.*]

Explanation of Table B.

[In this table the figures 1. to 5. inclusive are magnified 10 times in diameter or 100 times superficially; figures 6. to 9. are magnified 200 times in diameter or 40,000 times superficially; and figure 10. is magnified 60 times in diameter or 3600 times superficially.]

Fig.
1. A front and fig. 2 a back view of an infected ripe wheat grain, examined August the 5th, 1805.
3. A longitudinal section of the same filled with hundreds of worms cemented together, in a torpent state.
4. A transverse section of the same.
5. The transverse section of a grain nearly ripe, which was inoculated and infected with the worms and the fungi of the smut-balls, containing several large and some small worms, and filled with the fungi of uredofœtida or smutballs.
6. A newly laid egg with the young worm visibly coiled up in it.
7. A young worm in the act of extricating itself from the egg.
8. An egg from which the worm is recently come out, after which the egg soon shrivels and decays.
9. A young worm which had been some time extricated from the egg.
10. A group of grain worms of all sizes, as seen under water in the field of the microscope, examined July the 15th, 1808: at A is one of the largest parent worms, in the act of laying or casting its eggs; at B is a smaller parent worm not yet come to maturity; the rest are young worms all very lively.

ERUPTION OF MOUNT ÆTNA IN 1832.

[The following valuable communication is from an English gentleman who visited Mount Ætna immediately after the eruption in November last; and we hope to present our readers with an account of his ascent of the same mountain.]

The present convulsion was quite unexpected. Although for the last two years we have had in our neighbourhood several very clear proofs that the materials of combustion were in motion, yet they none of them seemed to proceed from this mountain, which has always been regarded as the focus of these phenomena. Such, for example, has been the recent eruption of Vesuvius, preceded only a few months by an awful and destructive earthquake in Calabria, whereby the town of Catanzara suffered so materially in loss of property and lives. Previous to this was the appearance and disappearance of Graham's island, as the English called it, but St. Ferdinand's as named by the Neapolitans, which, while the dispute lasted concerning the name to be given it, put an end to the question by dropping its head under water again. All these show the elements below were at work. Messina felt several shocks of earthquakes, but it seemed as though that city felt only the remote effects of the subterraneous tempest, as on inquiry it was found that others northward had felt it stronger, and Catania, as well as the towns on Ætna, had not felt anything.

You will readily conceive that all Sicily was greatly astonished to see Ætna break out with such fury in the beginning of last November. The first alarm was given on the 31st October, when there opened, about three miles below the grand crater or summit, in a niche called the Valle del Serbo, a small volcano, which emitted smoke and fire only a few days. On the 3rd November, however, appearances began to wear a more formidable aspect. Seven small mouths were formed, about three miles lower than the first one. These being very close together, by the subsequent throes of the mountain became united into but two or three. It was from one of these mouths, now of considerable magnitude, that all the lava issued. The side of the mountain where the Valle del Serbo lies, is about W. S. W. from the grand crater, and in direction just over the town of Bronte.

Explosions were not very great in this eruption, and the quantity of stones and ashes ejected was not alarming. The progress of the lava was, however, highly so. Situated as the volcano was, on a very steep eminence, the first few days it flowed down the mountain with terrific rapidity; on arriving at more level ground it moved more slowly, and the stream began to widen. Here commenced the damage to the proprietors of land. The upper regions of Ætna are so cold as scarcely to be available for the purposes of tillage or cultivation. Lower down commences the Woody Region, which consist of large forest trees. Below these lie the Plains, which are mostly laid out in vineyards, the slope of them being very gradual, and here it was that when the liquid fire arrived there was most cause for alarm.

The direction which the lava first took was that of a straight line downwards, which it continued for about a mile, after which, meeting with the valley which divides Monte Gitto and Monte Lepre, it branched off in a southerly direction; it ran for about four miles thus, when it stopped. It now took another course, (from the place where it had first deviated from the direct line,) branching off afresh between Monte Gitto and Monte Malletta. It continued its course uninterrupted here, curving round the base of the mountains it met with, and, finally, coming direct upon Bronte, which place it might probably have reached, but for an extensive valley which so effectually protected it from injury from the lava, that it must have required, it is supposed, more than two months, of an equally violent flow of lava, to fill up this valley so as to put the town even in jeopardy. On a former occasion this valley, which almost surrounds the town like a moat, turned the course of the fluid on each side of it; so that while a tract of country several miles below Bronte, and farther from the crater, was completely ruined, this city, owing to its peculiar situation, remained untouched. As it was, it did not even reach so far, though within a mile and a half of it, having run a distance of about twelve miles from its commencement.

The breadth of the stream of lava was at its widest part a mile and a half; but this was in the lower regions, where it was not enclosed between the different mounts, but had spread considerably. This was certainly alarming, but engineers came from Catania to ascertain the state of the country, and to endeavour to turn the course of the fire, should Bronte stand in danger. This of course would have been ridiculous, were it not for the natural auxiliaries of situation, without which nothing short of madness could attempt to resist such a body of this terrible compound as now threatened. This lava, though very long in cooling, is not long in becoming solid, which it does, retaining its red heat. Brydone says that it can, by a very violent heat, be fused, but I cannot find that this has ever been done. The density of the state in which it arrives, after a passage of twelve miles, may be imagined as considerably greater than at its first outset. The flow is proportionably less rapid. This will in some measure account for the inconsistency in the reports respecting its violence, which some made out as tremendous, and which caused many persons to remove their furniture and effects from Bronte, under the apprehension that it would continue with the same velocity.

Nothing serves to convey a more sublime idea of the extent of this fire, than the fact of its being capable of continuing in a course of twelve miles without becoming solid. For not only does it retain this heat, but it imparts it to the loose stones and lava of former eruptions, which it encounters, in a nearly equal degree. During the greater part of its passage, it had to cross the tracts of lava-stone many centuries old. The stones though loose, have been suffered to lie, as, from their size and quantity, the trouble of removing them would never be repaid; as I am informed the soil lies many fathoms below, and the expense would be enormous.

I saw it on the 19th November: for several days previous the explosions had ceased, and ashes were no longer thrown out. The lava was then running into the valley behind Bronte, part of its course being intercepted to the view by the layers of stones which I have mentioned; for the lava, being liquid, naturally sank to

the bottom, leaving the surface covered for a considerable space. This, it must be owned, interrupted the beauty of the sight as a *spectacle*, as we all had anticipated a complete united mass of fire. Many who had come only to gratify their organs of vision, had set their expectations on a stream of fire, twelve miles long, and one and a half broad. But, owing to the curvilinear direction which it took, not more than three or four miles of it were visible at once, and it was only that breadth at its very widest part, at which period it had arrived at the more level parts of the mountain; when, being shallower than in the close deep ravines higher up, encountering a rock of ordinary size was sufficient to make a breach in the surface, which the eye detected. It was, however, a sight grand in the extreme.

At the valley above Bronte, the eruption may be said to have ceased. For several days nothing but a faint expiring flame was discernible at the crater, and the lava gradually flowed weaker and weaker, so that before the end of the month all those unruly combustibles, which had excited so much curiosity and alarm, had nearly subsided; a little continued even a few days after, following nearly the course of the other, but, from its diminutive volume, not being able to retain its liquid state more than for a mile or two. Before the year 1832 had closed, everything was quiet, but the lava will scarce have cooled for another twelve months, with such amazing heat does this fire issue from its abodes, and with such tenacity does it retain its influence. I cannot find that in any of the eruptions of Ætna, the lava runs for more than twelve or fifteen miles. All will depend upon the inclination of the ground it has to pass, and on its own volume. The eruption which came to Catania in 1669, generally accounted one of the most formidable ever known, proceeded from Monte Rossi (Brydone calls it, I think, Monpelieri), about twelve miles from the city, and eighteen from the main crater at the top. It threw itself into the sea at Catania, and it even appears astonishing how it can be kept so long in a state of liquefaction. The heat is felt at an immense distance. We were sometimes enveloped in a fog, and saw it only at intervals; but we always felt the warmth.

The devastation committed by the lava in its progress was indeed terrible. No object, however large, escaped. I watched the fate of an elm tree in full growth: on seeing the fire approach, I wished to notice how long it would be consuming. To my surprise, I saw it flare, and as suddenly extinguish, not a vestige of it remaining. From the intense heat I should suppose that it must have been very little else than charcoal some minutes before the fire actually arrived, which caused it to vanish with the effect of gunpowder.

The damage done has also now been correctly estimated. The principal sufferer has been the Prince Malletta, proprietor of the wood which the fire entered, burning up everything in its path, and effectually sealing the earth with a species of stone harder than the hardest granite, so that it will be ages before the ground can again be serviceable for cultivation; independent of the loss in timber, which was consumed standing. The vineyards below the woody region had their share, and this is the most valuable ground of any. Loss of life there has been none, nor of houses; the whole has been calculated at about £6000 sterling, and I have reason to think that this estimate exceeds the true damage. Higher than Bronte there is neither city nor village, so that no habitations could have been molested. Lord Nelson's estate, which was said to have been injured, never was touched, as it lies below Bronte.

In fine, this eruption of Ætna has been one of the most unexpected, most violent for the time of its duration, and most harmless for the extent of mischief, of any ever recorded. Most of these phenomena are preceded by those terrible electric shocks, sometimes causing more injury than the ebullition which follows. Here, no warning was given of its forthcoming, nor, when once begun with such fury, could so speedy a termination have been looked to. People in general, *not* proprietors of ground on Ætna, look on an event of this sort with great satisfaction, as they reasonably suppose they have been saved the terrors of an earthquake.

CITY OF CARLISLE.

Few of our English towns are more pleasantly situated than the capital of Cumberland—"bonny Carlisle," as it used to be fondly styled in border song. The triangular, or rather lozenge-shaped eminence on which it stands, swells gently up from the banks of the three rivers by which it is formed; the Eden which flows along its northern side on its passage to the Solway Frith, and the Caldew or Caude, and the Peteril, which encompass it on the west, south, and east. The Caldew falls into the Eden at the north-west end of the town, where the castle occupies the angle formed by the junction of the two streams. Eastward from this ancient fortress stands the cathedral, also a building of venerable antiquity. Both, besides being distinguished by their majestic dimensions, occupy the highest ground within the city, from the midst of which, accordingly, they are seen standing out to the sky at the distance of many miles. To make the effect still more imposing, the mound on which the city has been placed is in the centre of an extensive plain, unbroken by any other elevation, till we come to the mountainous ridges by which it is bounded, both on the north and south. The country immediately around is highly cultivated, and presents an aspect eminently rich and beautiful. Carlisle still retains its ancient walls, which, stretching out from both extremities of the castle, sweep in a curved line along the inner banks of the Eden and the Caldew, till they meet again at the opposite point, where formerly stood two ancient round towers called the Citadel. These forts have now been converted into halls and other apartments for the assize and county courts, after a design of Mr. Smirke's. The new building forms a great ornament to this end of the city, which is that at which Carlisle is entered from the London road, by what is called English Gate. From this gate, English-street runs in nearly a due north direction to the Cross, beyond which the continuation of the line receives the name of Scotch-street. At the termination of this latter stands Scotch Gate; and there is also a third gate, called Irish Gate, in the part of the wall looking to the west. Beyond Scotch Gate, the road, after passing through the suburbs, used to cross the Eden twice, the river here dividing itself into two branches; but of these, the one nearest to the town has now been carried back into the main stream, over which a magnificent bridge of five arches has been thrown, and the road continued into the town over the intervening hollow by a raised causeway, part of which also consists of a series of arches. The whole is built of white Scotch freestone, after a design of Mr. Smirke's.

The city of Carlisle is rich in historic associations; and its castle especially, though now left without a garrison, was long one of the most famous military strongholds of these realms. Both it and the Cathedral are built of a reddish freestone, which it must be acknowledged is but little favourable to architectural beauty. The latter edifice, in its oldest parts, appears to be of the Saxon times, and it was once of great extent; but during the Commonwealth the greater part of the western or longest limb of the cross which it formed was pulled down, and has not since been rebuilt. What remains of the nave is now used as one of the parish churches, while the cathedral service is performed in the choir. The Castle is supposed to have been begun in the reign of William Rufus, and, therefore, dates from the latter part of the

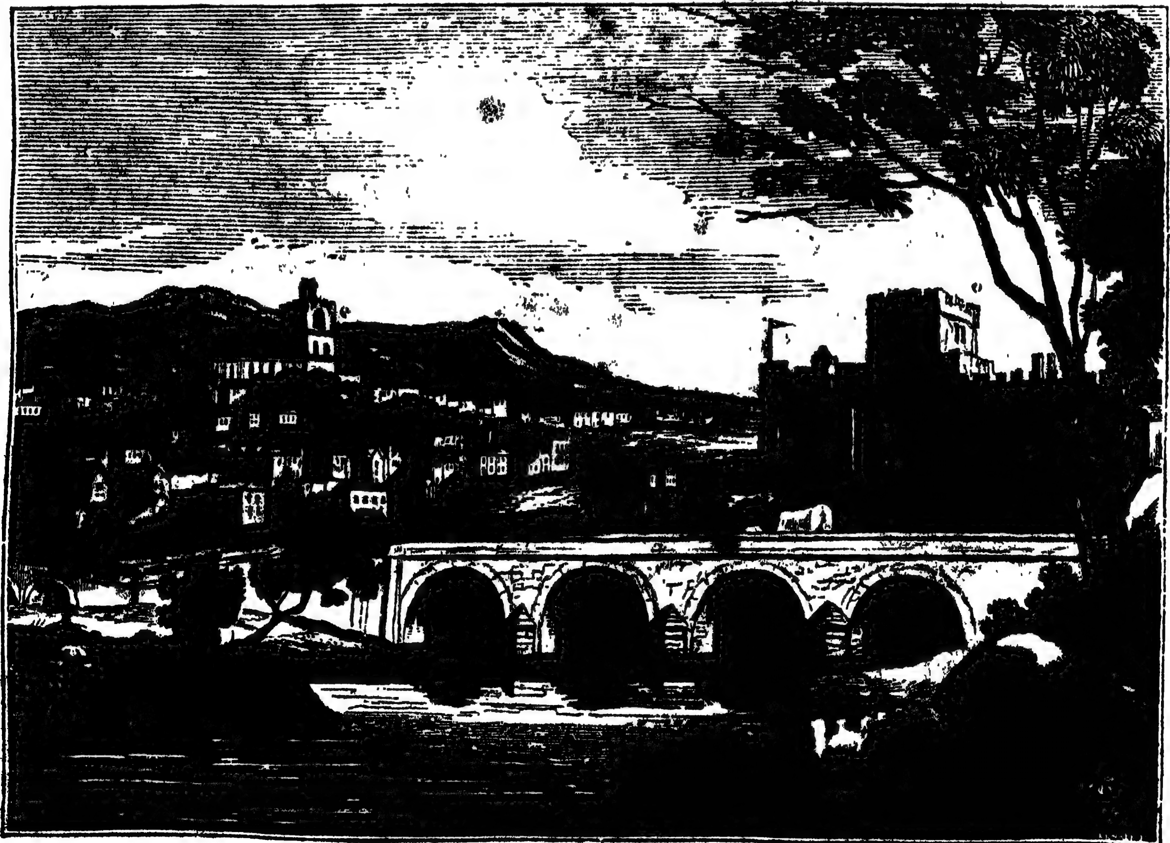
eleventh century. In those days, however, Carlisle was occasionally in the hands of the Scots as well as of the English; and much of the castle is said to have been erected by David I. of Scotland, who took the town in 1135. It was not finally annexed to England till the year 1237, in the reign of Henry III.

Since that date Carlisle has undergone many sieges. The last was that which it sustained in the rebellion of 1745, when it was taken by the Pretender, who was here formally proclaimed as king in the presence of all the municipal authorities in their robes. The garrison, however, which he left in the place was very soon after compelled to surrender to the Duke of Cumberland.

A century before this the town and castle sustained one of the most memorable sieges recorded in our history. On the breaking out of the civil war, the place had been taken possession of by the royal forces; and it was held by Sir Thomas Glenham, Commander-in-chief for the king in the north, when, in October, 1644, it was attacked by a division of the parliamentary army under the command of General Lesley. The besiegers were above 4000 in number, while the garrison with the armed citizens did not exceed 700. An interesting narrative of this siege has been preserved among the Harleian Manuscripts in the British Museum, written by a person of the name of Isaac Tullie, who was in the town all the time; and from the summary of Tullie's account, as given by Mr. Lysons in his *Magna Britannia*, vol. iv., we extract the following particulars:—

"At Christmas, all the corn was taken from the citizens, and a ration distributed weekly to each family, according to their numbers. The cattle were seized also and distributed in like manner, no more being given to the owner than to any other, except the head, heart, and liver. * * * April 3.—They had only thatch for the horses, all other provisions being exhausted. May 10.—A fat horse taken from the enemy sold for 10*s.* a quarter. May 23.—Provisions almost spent. May 30.—News that the king was come into Westmoreland. The garrison that day ate three days' provisions, and repented with a cup of cold water for three days after. * * * June 5.—Hempseed, dogs, and rats were eaten. The citizens so shrunk that they could not choose but laugh one at another to see their clothes hang on 'hem as upon men on gibbets, for one might put one's head and fists between the doublets and shirts of many of them. June 17.—Some officers and soldiers came to the common bakehouse, and took away all the horse-flesh from the poor people, who were as near starving as themselves. June 22.—The garrison had only half a pound of horse-flesh each for four days. June 23.—The townsmen petitioned Sir Thomas Glenham that the horse-flesh might not be taken away, and said they were not able to endure the famine any longer; several women met at the cross, abusing Sir Henry Stradling, the governor, who threatening to fire on them, they begged it as a mercy, when he went away with tears in his eyes, but said he could not mend their commons. The surrender was on the 25th. A curious feint was practised, to impress the besiegers with the idea that the reports of the distress of the garrison were untrue, a few days before the surrender. An officer sent in by General Lesley, two days following, was sent back in a state of intoxication, from the contents of the only barrel of ale which had been in the garrison for several months, and which had been brewed and preserved for some such purpose, by Dr. Barwell, the chancellor, with the privity of the governor."

One of the most singular instances on record of a great military fortress being broken into by surprise, is that of the famous border exploit of the deliverance of the Scottish freebooter, William Armstrong, of Kinnimonth, commonly called Kinmont Willie, from the donjon keep of Carlisle Castle. The historical facts of this achievement, which was effected on the 13th of April, 1596, will be found copiously detailed and illustrated in Scott's "Minstrelsy of the Scottish Border."



[View of the City of Carlisle.]

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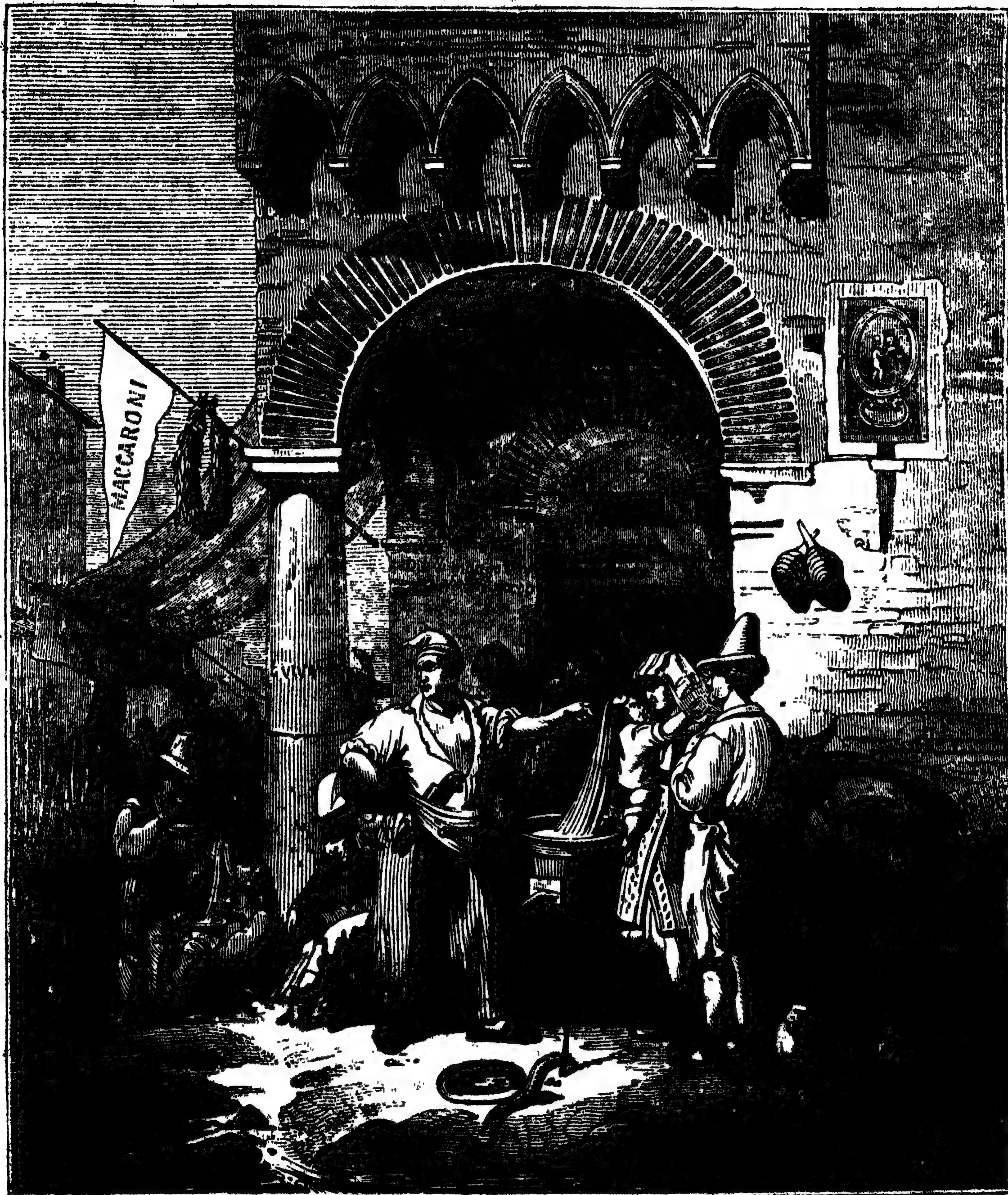
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NEAPOLITAN MACCARONI-EATERS.



[The Maccaroni Seller of Naples.]

Maccaroni, or maccheroni,—the learned are divided as to the orthography and etymology of the word,—is the principal food of the poorer, and the favourite dish of all classes of Neapolitans. So much is this the case that the people of Naples have had for many ages the nickname of "Mangia-maccaroni," or maccaroni-eaters.

A fine English lady at Paris once asked a gentleman of her own country who had recently arrived from Italy, "On what sort of a tree maccaroni grew?" But, in all probability, most of our readers who have seen the substance do not partake of her ignorance, but know that it is made with wheaten flour.

"Grano duro," or "Grano del Mar Nero," the small, hard-grained wheat grown in the Russian territories on the Black Sea and shipped at Odessa and Taganrok, is considered the best for the purpose, and was once imported into Naples for the maccaroni manufacturers. As that kingdom is essentially agricultural itself, the importation of this foreign corn was felt as an evil; but as the manufacturers always declared they could not

produce good maccaroni without it, and as a deterioration in the quality of the national dish would be felt as a serious national calamity, the import trade continued to be allowed, though the Neapolitan agriculturist frequently could not find a market for his home-grown corn. A wiser step, however, than prohibition, was to procure and cultivate the particular hard grain in their own territories, and this has now been done for many years in Apulia, where the soil and climate are considered as most favourable. This grano duro is chiefly shipped at Manfredonia, Barletta, Bari, and other ports on the Adriatic, and is sold in the Neapolitan market under the name of the port it comes from.

The best maccaroni is made entirely of the grano duro; but, in the inferior qualities, this is sometimes mixed with soft wheat. The conversion of the flour—which is somewhat more coarsely ground than that intended for bread—into the long, round strings called maccaroni, is effected by a very simple process. With the addition of water alone, the flour is worked up into paste, and this paste is kneaded for a length of time, by a heavy, loaded block of wood, which beats into the trough where the paste is deposited; this block or piston is attached to a beam acting as a lever, whose fulcrum is near to the block, whilst the other extremity of the beam is some eight or ten feet from the fulcrum. One or more men or boys seat themselves astride at the farther end of this beam, and, descending with their own weight and springing up by putting their feet to the ground, give the requisite reciprocating motion to the lever. They, in fact, play at see-saw with the block at the shorter end of the lever; and the effect produced on the eye of a stranger by a large manufactory where several of these machines and a number of sturdy fellows, nearly naked and all bobbing up and down, are at work, has something exceedingly ludicrous in it. When the paste has been sufficiently kneaded, it is forced, by simple pressure, through a number of circular holes, the sizes of which determine the name to be given to the substance. That of superior diameter is maccaroni, that smaller is vermicelli, and that smaller still is called fedelini. The maccaroni is hollow throughout, and many persons have been puzzled to know how it is formed into these long tubes. Nothing is more simple. Over each of the larger holes meant for maccaroni a small copper bridge is erected, which is sufficiently elevated to permit the paste to pass under it into the hole: from this bridge depends a copper wire which goes right through the hole, and of course leaves hollow the paste that descends through the hole. Such of our readers as have seen our common clay-pipes for smoking manufactured, will readily understand this, for this part of the process is the same for maccaroni as for pipes. There are some minor distinctions in the preparation of these respective articles which it would be tedious to explain, but the material and main process are the same in all. When the paste has been forced through the holes, like wire through a wire-drawer's plate, a workman takes up the maccaroni or vermicelli and hangs it across a line to dry. From the long kneading it has received, the substance is very consistent, and dries in unbroken strings that are two or three yards in length.

Besides maccaroni, vermicelli and fedelini, which are in most general use, the Neapolitans make from paste similarly prepared an almost infinite variety of other culinary articles, some of which are long, narrow, and flat, like ribbons,—some broad and thin, like sheets of paper,—some round, like balls,—some in the shape of beans, or smaller, like peas, &c. &c. To each of these the copious Neapolitan dialect has affixed a distinctive name. The vocabulary is thus immense! After those we have mentioned, however, the greatest favourites are, Lasagna, Gnocchi, and Strangola-prevete*, (the last an odd designation, signifying "strangle, or choke priest!")

Manufactories of a like nature exist at Genoa, and in some other parts of the peninsula; but the Genoese mix saffron with their paste, which gives it a yellow colour; and the Neapolitans, proud of the only manufacture in which they excel, treat with great contempt the similar productions of all the rest of Italy. It must be allowed, indeed, even by the unprejudiced, that their maccaroni is by far the best. It is made, of course, throughout the whole of this maccaroni-eating kingdom; but the best is manufactured on the coast of the Bay of Naples, about La Torre del Greco and La Torre dell' Annunziata, two towns through which the traveller must pass on his way to the ruins of Pompeii, Pæstum, &c., and where he is sure to see the maccaroni works in full activity. The productions of these works go by the general name of "Pasta della costa." They command higher prices than any maccaroni, vermicelli, &c., made elsewhere, and are exported in very considerable quantities. Extraordinary importance is attached to these articles in some remote places in the interior of the kingdom, where communication with the capital is difficult.

In respectable Neapolitan houses maccaroni is on the dinner-table at least twice or thrice a week,—in many, every day. It is served up first; and on maccaroni days, generally speaking, no soup appears. The writer would rack his memory and ingenuity in vain in attempting to describe the numerous ways in which it is cooked. But these are two of the most common preparations. The maccaroni is thrown into a caldron containing boiling water, care being taken to bend and not to break the strings more than necessary (for half the beauty of this pasta consists in the length of its fibre), and it is there left to boil until, from white, it assumes a greenish tinge, which, if properly managed, it does in about a quarter of an hour.

Verdi-verdi! green! green! is the expression of the Neapolitan's delight, when his maccaroni has been properly boiled to the very second. It is then taken out of the caldron—drained of all the water, then saturated with some concentrated meat-gravy, sprinkled throughout with finely-grated cheese, and served up in a large tureen, in firm unbroken strings, which are easily detached from each other.

In the second preparation the maccaroni, after being boiled in the same manner, (for the Neapolitans energetically maintain that there is only one proper way of boiling it,) and then strained, is merely anointed with a little butter which is thrown in, in solid pieces, and dissolved by the heat contained in the paste—to this grated cheese is added, as in the other process, and a further addition of tomata, or love-apple sauce, makes the dish excellent.

The reader may be assured, that cooked in either of these ways—to say nothing of the other more recondite preparations of the Italian cook—maccaroni is incomparably superior to that pappy, greasy, indigestible substance—a positive disgrace to the name it bears—which is sometimes intruded on our English tables. Prepared in the Neapolitan manner, maccaroni is nutritious, satisfying, light, and easy of digestion.

It has been already said that this paste forms the principal food of the poorer classes of Neapolitans. They would be too happy, however, if they could get it every day! In the course of the week they are often obliged to satisfy themselves with bread generally made of Indian corn, with a few onions or heads of garlic, and a little *minestra verde*, (or greens boiled in plain water, with a small lump of lardo or hog's fat thrown in to give a flavour). Many thousands of them do not eat meat for weeks, nay months together, but they care not for this if they can have their maccaroni, which is a substitute for every eatable.

* Prevete, (Neapolitan for the Italian word Prete,) Priest.

Venders of this national commodity are established in every corner of the city of Naples. Some have shops or cellars where they prepare and retail it, but a much greater number cook it on moveable furnaces in the open air, and sell it to their hungry customers in the streets, who eat it from the dealer's bench without plates, knives, forks, spoons, or any such luxuries. In former times these maccaroni stalls dared to stand under palaces, and lined even the Strada Toledo, and other of the principal streets, mixed up, in grotesque confusion, with the stalls of other retailers and of artisans. The concise Forsyth, who was there at the beginning of the present century, says, "A diversity of trades disputes with you the streets; you are stopped by a carpenter's bench, you are lost among shoemaker's tools, you dash among the pots of a maccaroni stall, and you escape behind a lazarone's night basket." Such is still the fate of the inexperienced perambulator in some of the lower parts of the town; but of late years the characters and things enumerated have gradually been obliged to retire from the main streets and confine themselves to lanes and alleys, and the outskirts of the town;—in which last places, particularly on a *giorno di festa* or holiday, the maccaroni venders are to be found in compact groups, and (not satisfied with the temptation offered by their steaming caldrons and well-known stalls) waving samples of their fare, at the end of long ladles, in the air, and inviting, at the top of their Stentorian voices, all passers by to stop and partake.

The cut at the head of this notice will give a very good idea of one of these stalls, as well as of the primitive manner in which the poor Neapolitans eat their favourite food. They pride themselves in their dexterity in taking up in the naked hand a bundle of these long strings, and sliding them down their throats without breaking them. The maccaroni thus sold in the streets and by the way-sides, is merely boiled in plain water, and more frequently eaten without any condiment whatever sometimes, however, it is sprinkled with some grated *caccia cavallo*, (a coarse white cheese made of buffalo's milk,) for which additional luxury a proportionate charge is made. The mere mention of "*quattro maccheroni con o zughillo*," or "some maccaroni with meat gravy," will make your lazarone's mouth water, as *that* is a luxury which rarely comes within his means*.

For five *grani* (about two-pence English) a man may thus very well stay the cravings of hunger,—for ten *grani* he may have a complete feast, with scraped buffalo cheese included. With three grani more he can indulge in a *carafa* or bottle of common wine, or in summer time, if he prefers it, for the same sum he can procure a large glass of deliciously iced-water, and half of a huge melon.

It is worthy of remark that your genuine lazarone despises to use a wine-glass or even to touch the bottle with his lips—he drinks like the New Zealander, (see Cut in No. 27 of our Magazine,) and frequently holding the bottle almost at arm's length, pours a continuous stream from its neck into his mouth. This also is a feat in which they take pride, and he is deemed a good performer who can make the wine describe a beautiful curve between the bottle and his lips, and by a sudden jerk of the hand stop its further outpouring without spilling any of the liquor.

On some future occasion we may return to the subject of this very curious class of men, who are certainly *different* from, and, all their qualities considered, *better* than, the pictures which hasty or prejudiced observers have drawn of them—but for the present we must take our leave of the maccaroni-eaters.

* It would be difficult to say why, but the Neapolitans, in speaking of a certain portion, or as we should say "a little maccaroni," always use the numeral word *four*, as the Scotch say "a few broth." For other eatables they apply the number *two*,—thus, "*ho mangiato due quaglie*." I have eaten two quails—in which sense the words must not be taken literally, for your interlocutor may have eaten a dozen quails—the phrase only means that he has eaten of the birds (or whatever else they may be) mentioned, and is not at all specific of number or quantity.

ARABIC PROVERBS AND PROVERBIAL EXPRESSIONS.

1. Sometimes the tongue cuts off the head.
2. If your friend be honey, do not eat him altogether.
3. The provisions suffer when the cat and the mouse live on good terms.
4. Shave your own chin when the beard of your son is grown.
5. When you pass through the country of the one-eyed, make yourself one-eyed.
6. If you are so unhappy as to have a foolish friend, be yourself wise.
7. When there are many captains, the ship sinks.
8. If you cannot master the whole, yet do not forsake the whole.
9. When things tire you at the head, take them by the tail.
10. When you have spoken the word, it reigns over you; but while it is not yet spoken, you reign over it.
11. When you are an anvil, have patience; when you are a hammer, beat straight.
12. When the counsellor grows rusty, the counsel will be polished.
13. Time will teach him that has no teacher.
14. He that passes through the onions, or their peel, will smell of them.
15. He who cannot understand at a glance will not understand by much explanation.
16. He who makes himself bran, the fowls will scrape him.
17. Sucking becomes bitterness by weaning.
18. He that sleeps without supper, gets up without debt.
19. Though the will be idle, yet be not you idle.
20. He builds a minaret, and destroys a city.
21. He has sold the vineyard and bought a wine-press.
22. The fig-tree looking on the fig-tree will be made fruitful.
23. Three things evince the character of the mind,—books, presents, messengers.
24. Borrowed dresses give no warmth.
25. He is warm towards his friend only to burn him.
26. Every man leaps over a low wall.
27. The mother of the dumb knows the language of the dumb.
28. The mother of the murdered sleeps, but the mother of the murderer does not sleep.
29. Need developes the mind.
30. The best friends are those who stimulate each other to good.
31. The best companions, when you sit, are good books.
32. The best visits are the shortest.
33. Take the thief before he takes you.
34. The carpenters have sinned, and the tailors are hung
35. To be weaned is a difficult task for an adult.
36. Ride not on the saddle of thy neighbour.
37. Silence is often an answer.
38. I like the head of a dog better than the tail of a lion.
39. Slipping may happen even in July.
40. He plucks out the tooth of the dog, and barks himself.
41. He was absent two years, and came back—with two yellow boots.
42. The drunkenness of youth is stronger than the drunkenness of wine.
43. Sciences are locks, and inquiry the key to them.
44. Take counsel of him who is greater, and of him who is less, than yourself, and then recur to your own judgment.
45. The worst kind of men are those who do not care when men see them doing wrong.
46. Close the window through which an ill-wind enters to you.
47. The owner of the house knows best what is in it.
48. The mules went to ask horns, and returned without ears.
49. In adversity the real principles of men appear.
50. Honour yourself, and you will be honoured; despise yourself, and you will be despised.
51. An hour's patience will procure a long period of rest.

GREENWICH OBSERVATORY.



[View of the Observatory at Greenwich.]

An observatory is a building furnished with instruments for observing the places and movements of the heavenly bodies; and the perfection to which the science of astronomy has been carried in modern times is in great part to be attributed to the existence of such establishments. It has been conjectured by some, that observatories were erected by various nations of the ancient world, and the pyramids of the Egyptians have in particular been represented as intended to serve that purpose; but there is no certain evidence that such institutions, in the modern sense, existed either among that people or any other of those early times. There is little reason to believe that the fathers of astronomy, either in Chaldea or in Greece, were assisted in laying the foundations of their science by even the simplest instruments.

In modern times, one of the earliest observatories, and one of the most famous, was that founded by the celebrated Danish astronomer, Tycho Brahé, on the small island of Huen, in the Sound, which was made over to him for his residence by the Danish king, Frederic II. The first stone of this building, which was intended to serve for a dwelling-house to the astronomer as well as for a watch-tower from which to contemplate the stars, was laid on the 8th of August, 1576. It was, in all, sixty feet square and seventy feet in height. Tycho gave it the name of Uranienborg, that is, the Palace of Urania, the goddess of astronomy; and here he spent seventeen years of his life in the unremitting cultivation of his favourite science. "We have spent a year," says Malte Brun, in the "Biographie Universelle," 1812, "in traversing that classic soil, and have there retraced the boundary of Uranienborg, which is still marked out by elevations formed by the brick rubbish: the flocks now gambol over the remains of the palace of Urania. Farther off, in a field of corn, is found a cavern which is said to have appertained to the mansion. It was of this that Picard, having been sent by the Academy of Sciences of Paris, availed himself in determining the longitude and latitude of Uranienborg. The garden, contiguous to a farm-house, built below the site of the house, still preserves some slight traces of its ancient splendour. A meadow is shown, occupying a hollow which, in the time of Tycho, was filled with a lake;—the little creek may still be detected in which his pleasure-boats used to lie at anchor. This lake received the rain-water, collected in ten or twelve reservoirs built here and there in the island; and from it issued a rivulet, still partly in existence, but formed by the hydraulic skill of Tycho, into a current strong enough to turn a mill, of so ingenious a construction that it served at one time to grind corn, at another to make paper, and at another to dress leather. Various remains of dykes and other buildings still attest with what facility the great astronomer descended to all sorts of economical details."

Among existing institutions of this description, our own observatory at Greenwich, of which a representation is prefixed to this notice, has long held an eminent place

It stands on the most elevated spot in Greenwich Park, and consists of two buildings,—one a low oblong edifice, which is properly the Observatory, and the other a house for the Astronomer Royal. The upper part of the latter, however, besides serving as a library-room, is also filled with instruments; and there is a camera-obscura on the top of the house. The library contains many scarce and valuable works, principally on scientific subjects. The Observatory is divided into four apartments, fitted up with transit circles, quadrants, clocks, sectors, and other astronomical instruments, among which are some of the finest productions of Troughton, Graham, Hardy, Earnshaw, Dollond, and Herschel. Among them is a transit instrument, that is, an instrument for observing the passage of the different heavenly bodies over the meridian, of eight feet in length, which is famous as having been that used by Halley, Bradley, and Maskelyne. Bradley's zenith sector is also in one of the rooms, with which he made the observations at Kew, from which he deduced his discoveries of the aberration of light and the mutation of the earth's axis. Two small buildings, with hemispherical sliding domes, stand to the north of the Observatory, which are fitted up chiefly for the observation of comets. Most of the old observatories were provided with a deep well, from the bottom of which the stars might be observed in the day-time; and that of Greenwich had also formerly an excavation of this kind, descending to the depth of a hundred feet, in the south-east corner of the garden. It is now, however, arched over.

Greenwich Observatory stands on the site of an old fortified tower belonging to the crown, and said to have been first erected in the early part of the fifteenth century, by Humphrey, Duke of Gloucester, the brother of Henry V., one of the earliest patrons of learning in this country. It was either repaired or rebuilt by Henry VIII. in 1526; and continued long afterwards to be considered a place of some strength. Paul Hentzner, the German traveller, says that, in the time of Elizabeth, it was known by the name of "Mirefleur," and was supposed to be the same which is mentioned in the romance of "Amadis de Gaul."

The idea of erecting an observatory here is said to have originated in the circumstance of a Frenchman of the name of St. Pierre making application, in 1675, to Charles II. for a reward on account of a method which he professed to have discovered of finding the longitude. As it depended upon the ascertainment of the distance of the moon from one of the fixed stars, John Flamsteed, who, although as yet but a young man, had already distinguished himself as an astronomical observer, was applied to as the person best able to furnish accurate data on which to found the necessary calculations. He accordingly supplied what was desired; but remarked, at the same time, that with the imperfect means which then existed in this country for the examination of the heavens, no such dependence could be placed upon any observations which might be made as to render them of any use in so nice a matter as the calculation of the longitude. When this remark was represented to the king, Charles II., he immediately declared that England should no longer remain without a public establishment for the advancement of astronomical investigations. The resolution being thus taken to build an observatory, various spots were thought of for its site in the neighbourhood of the metropolis, and, among others, Hyde Park and Chelsea Hospital; but at last, on the recommendation of Sir Christopher Wren, the site of the Castle of Greenwich was preferred. The foundation-stone of the building was laid on the 10th of August, 1675. Flamsteed was appointed the first superintendent of the establishment, under the title of Astronomer Royal; and he commenced his observations in August of the following year. This great astronomer continued to reside at the Observatory till his death, on the 31st of December, 1719, forty-three years after his appointment. The results of his laborious observations and calculations during the whole of this period were given to the world in 1725, in three volumes folio, under the title of "Historia Celestis," an immortal monument of his industry and genius. Flamsteed was succeeded as Astronomer Royal by the great Halley, who occupied the situation twenty-three years, having died in 1742 at the age of eighty-five. His successor was another most distinguished astronomer, Bradley, the discoverer of the aberration of light, or that difference between the apparent and the true place of any of the fixed stars which is occasioned by the motion of the earth and the motion of light from the star to the observer. After Bradley's death, which took place in 1762, Mr. Bliss held the office for two years, when he died, and gave place to the late eminent Dr. Maskelyne, who enjoyed it for a period not much short of half a century, having survived till 1810. He was succeeded by the present Astronomer Royal, Mr. Pond. Since 1767, in conformity with an order of his majesty, the observations made by the Astronomer Royal at Greenwich have been annually published under the superintendence of the Royal Society. The admirable instruments with which the Observatory is provided, together with the ability and high character of the successive astronomers, have secured to the Greenwich observations a reputation for accuracy scarcely rivalled by those of any other similar institutions.

THE DEAF TRAVELLER.—No. 1.

[We have much pleasure in placing before our readers the first of a series of papers, which we think will be found highly interesting, not only from their intrinsic merit, but from the peculiar circumstances of the writer. These circumstances he has detailed in the following introductory account of himself. We have only to add, that the writer has been introduced to the notice of the Society by a valuable Member of one of its Local Committees, who is fully aware of his singular history.]

I AM somewhat of a traveller, and have lived for several years under circumstances very different, and in the midst of scenes very distant, from those of my younger days. Unless, therefore, I were a person of more than ordinary dulness and want of observing powers, I ought to have something to relate of the things I have seen and experienced, in which the readers of "The Penny Magazine" would be interested. Yet there are circumstances in my condition which would exonerate me from censure had I nothing at all to say, or less than I really have. But I do not intend to shelter myself under this excuse, though I shall presently state what are the circumstances to which I refer.

It is not yet a month since I returned to my native country, after an absence of four years from its shores. I remember that, on my return in the year 1829 from a *former* absence, the first place at which I stopped after having landed was a bookseller's shop, thinking that I should be able, from the display in its windows, to infer the modifications which our popular literature had received while I had been abroad. I distinctly recollect that the first book on whose open title my eye fell was, "A Treatise on the Art of Tying the Cravat," with a portrait of the author. Now, though perhaps this was not a circumstance from which any just inference could be drawn, it gave an impression to my mind which has since remained mixed up with all my recollections of that occasion.

On my *late* return, I made a similar pause at the first book-shop I saw; and there "The Penny Magazine," and other publications of similar price, attracted my gaze. I had not previously seen any of them; and abroad I had only gathered from newspapers that cheap periodical works, of an inflammatory and seditious character, were in extensive circulation. I therefore looked on them with some degree of prejudice; but, not to be

unjust, I determined to form my own estimate of their merits, and, entering the shop, purchased specimens of all the various little publications I saw on the counter and in the window.

It would not in this place be proper to say what I thought of their respective claims and pretensions; but, upon the whole, I saw much cause to be delighted with the efforts which had been made in my absence to bring useful and interesting information within the reach of the people. It is true that I remembered similar attempts had been made from seven to twelve years back; but the works which were then put forth, such as "Saturday Evening," "Sunday Morning," "The Portfolio," "The Spirit of the Times," &c. &c., soon terminated their career, for they were much less useful, less interesting, and less ably conducted than is now the case with works of much inferior price. These publications were, however, not without their merits; and their failure may doubtless be in part attributed to the fact, that the public mind was not at that period so athirst for information as at present. One only of the works started about that time still survives. The "Mirror" may be regarded as the parent of this class of literature: it has gone on improving from year to year.

With the attention I had given to such attempts from the commencement, I could not fail to be much interested in the existing undertakings in the same department which were, on the occasion mentioned, brought under my notice. Some of the papers I had purchased at the shop I skimmed over in my way home, cutting open the leaves with my fore-finger for want of a knife; and before I reached my lodgings I had felt that I should much like to have to do with some of these publications, particularly "The Penny Magazine," in which I felt an especial interest. When I got home, these vague wishes were confirmed by a letter from some friends in the country which I found waiting for me, and in which my attention was called to this very object. Through the kindness of one of these, and of some gentlemen connected with the "Society for the Diffusion of Useful Knowledge" to whom he introduced me, I am happy in being now enabled to carry these wishes into effect.

In my first set of papers I purpose to say something about my travels; but as I am very peculiarly circumstanced, my readers will not so well understand what is to follow unless I previously tell them something about myself. I shall not be very particular however; for as I think nothing in my travels so interesting as some of the earlier circumstances of my life at home, I shall probably hereafter call attention to them more in detail.

I have certainly, in the course of my life, been in very remarkable and interesting situations; but I remember few more interesting than that in which I am now placed whilst talking to a million of people about *myself*. But of the million I calculate that 950,000 are good and kind people, and I feel much encouraged by this consideration; though still if I had a friend at hand to do this for me, I would much rather leave it to him.

Circumstances, on which I am unwilling to dwell, left my early age exposed to as much poverty and destitution as it is probable that any of my readers can have known. To this not uncommon class of calamities was, in early boyhood, added the deprivation of the sense of hearing, and since then I have lived in as total and absolute deafness as I suppose can be possibly experienced. My speech also was so far affected, whether by inability or disuse, that, though with a painful effort I *could* speak, I seldom uttered five words in the course of a week for several years. I always said the little I had to say in writing; and I know not whether it be not to this circumstance I owe that habit of composition which now enables me to address the readers of the Penny Magazine. After some years I was induced to make a vigorous effort to recover the use of my vocal organs; and now, though I am told my voice is unlike the voices of other men, I always express myself verbally, and am pretty well understood, especially by those who are accustomed to my manner of speaking. Those, however, who do not know me, often take me for a foreigner; and to this mistake, perhaps, my complexion, browned by the warmer suns of the East, not a little conduces: all, of course, carry on their part of a conversation with me either by means of the finger-alphabet or in writing.

How far this circumstance of my becoming deaf at so early a period of life, by depriving me of many external sources of interest and occupation, may have tended to direct my attention to the pursuit of knowledge in the midst of overwhelming difficulties, is a question which I may hereafter consider. Certain it is, that the scanty supply of books I was able to procure afforded me, in these circumstances of physical and external deprivation, almost the only comfort and satisfaction open to me; though I little contemplated the extent to which these pursuits would modify my external circumstances, as they have done. My readers will now easily perceive that the situation which I have been describing must have given a very peculiar character to the history of my life and of my travels, which will not, I apprehend, diminish their interest in the things I have to tell.

A few years after my deafness commenced, I became the inmate of a workhouse, and remained there several years, with the exception of a short interval during which I was a parish apprentice. This interval I am disposed to look back upon as one of the least happy periods of my life; for my master used me most unkindly, and I had a spirit that was affected more strongly by unkindness than by external suffering and destitution. An excellent friend, however, at last brought my case before the magistrates, and by them my indentures were ultimately cancelled. I returned to the workhouse, and really felt my return as a relief and happiness: my duties there were not heavy; and the unpleasant circumstances of such a situation were softened by the kindness of those with whom I had to do. Their kindness also afforded me more personal liberty and consideration than the inmates of such establishments usually enjoy.

At last, while I was yet a lad, my situation came to the knowledge of some gentlemen of the place, who bestirred themselves with great activity and kindness in my behalf. They raised money for me; they removed me from the workhouse; and for a year after I remained drinking my fill of knowledge from the books in the public library of the town, to which I had free access.

It is my present purpose rather to introduce myself than to relate the circumstances of my life. So I shall now only say, that since the above period I have, in various situations and employments, resided one year in Exeter, nearly three in London and its neighbourhood, nearly two in the island of Malta, more than three in Bagdad, and have spent nearly two years in travelling and voyaging to and from the two latter places. In all these scenes and situations, I have endeavoured to keep one object at least steadily in view—the acquirement of such information and general knowledge as I found open to me in the midst of much occupation, and of difficulties which, though considerably different from those of my earlier life, have often been very great.

[To be continued.] J. K.

British Museum.—The great increase of visitors to this national establishment is very remarkable; and particularly gratifying to all those who are anxious that the people should enjoy these unexpensive pleasures which inform their understandings and elevate their tastes. From the 10th June to the 10th July, the aggregate number of visitors on the three public days of each week was thirty-two thousand; and on the 10th July above three thousand seven hundred persons were admitted.

THE PLAIN OF MARATHON.

"As many errors have crept into the descriptions which have hitherto been given of this celebrated spot, I will endeavour to correct them by the results of a close and careful personal inspection of it. The larger and more southerly half of the plain, which forms the real Plain of Marathon, has two arms stretching forward in a westerly direction; these are divided by the Kotróni. It is intersected by this river, which does not, however, form any natural boundary, as its bed is quite firm, and even in winter has not more than two feet depth of water; both foot and horse indeed may advance close to its very mouth without obstruction. At the upper extremity of the southern arm lie the village of Vranás and a small monastery, built on the steep bank of a mountain stream, which descends from the Pautelikos, between the Aphorismós and Argaliki, and loses itself in the plain, after flowing about three-quarters of a mile. A third streamlet springs at the eastern foot of the Argaliki, converts an interval of about one thousand paces between that mountain and the sea into a swamp, forms an islet one hundred and fifty paces in length and breadth close to its mouth, and then falls into the sea. This marshy track, to the south, is called Ξυλοκίρυσα. The whole plain is at this day divided between four or five owners; namely, the Monastery of Asomatos, or Petraki, near Athens; that of St. George in Vranás; and two or three private individuals. The country people told me that it does not afford subsistence to more than three hundred men and women, besides children; but that, in a couple of years and with proper cultivation, it would maintain ten times that number. The population is wholly Albanian, for the Greek owners reside in Athens. The soil of the plain is of a reddish hue, and rather of a rich quality; there is no species of cultivation to which it is not adapted; and it is, without exception, the finest tract of land in all Attica. There cannot be a more deplorable sight than its present neglected condition; this is the natural consequence of the wretched system which obtains throughout Greece in the letting of property. The owner divides the produce of his land with his lessee in conformity with a fixed scale; and out of this custom has grown the appellation of *collegas*, or partner, which the one applies to the other. The proprietor furnishes the seed corn, oxen, sheep, utensils, &c., and his lessee or partner defrays the expense of labour. It frequently happens that the one endeavours to overreach the other, or at least that they live in constant apprehension of reciprocal duplicity. Hence neither of them expends a single para in improving the property; the lessee indeed has seldom the means of doing so. The landholder is quite satisfied with his tenant if he do not make him a less return than the former occupant; and the tenant, on the other hand, never grumbles if the land but yields himself and his family a scanty subsistence. As to manure, change of crops, and the like, not a thought of them ever crosses their minds. Under this state of things, the lazy Albanian turns up the surface of his ground, year after year, scarce a couple of inches deep, with a pair of oxen roped to a plough, which has been justly designated 'ante-diluvian;' and as the stones and thistles do not get out of his way of their own accord, he very carefully gets out of theirs. Amidst this wilderness of weeds and thistles, he casts his pittance of unclean seed about him; harvests corn, weeds, and thistles, in one indiscriminate heap together, sets his asses to tread it out in the open air, and either consumes or sells his stock of corn, weeds, dirt, sand, and stones, without taking the slightest pains to dissolve their partnership. Such is the actual process of husbandry in Greece. The ancients extol Marathon as being rich in wine and oil, and perchance there may have been a sprinkling of vineyards in the northern part of the plain previously to the recent war; but there was not an olive-tree in existence, though it would be attended with great advantage if the whole plain were planted with these trees, for their shade would keep up a greater degree of moisture in summer throughout the entire plain. Instead of this, the country people resort to Athens for all the oil which they consume. With the exception of a few fig-trees in the neighbourhood of Marathon, and one here and there on the banks of the stream, the plain is destitute of shrub or tree. Nay, as if to prevent the gradual increase of foliage, even on the surrounding mountains, so far as they are accessible to sheep or goats, the owners of the ground, besides maintaining numerous flocks of their own, take money from the nomadic Wallachians in winter for permission to drive their herds into the plain. We met with two encampments of these Wallachians, each consisting of between fitty and twenty huts, on the declivities of the Kotróni and Stavrokoráki. The mound, which the natives call ὁ σωρός, and where the 192 heroes were interred, rises like a flattened globe, about thirty feet above the surface of the plain; the very first sight of it beespeaks it the work of human hands. It is formed of the same red coloured earth as the soil around it, and when once dry and hard, might readily bid defiance to the autumnal rains for a couple of thousand years in so dry a climate as this. It was opened by Fauriel and others on the west side, but they have not penetrated farther than the centre: judging from its remaining proportions, it appears to have lost little, if anything, of its original height. Neither did they proceed to a sufficient depth to disturb the manes of the heroes in their long slumber. I could discover no vestige of the mounds in which the Platæans and slaves were buried. Some hundred paces north-west of the Sorós, lie two or three masses of marble fragments; one of them contains a small altar, two feet ligh, of more recent workmanship; and a second, a quadrangular pediment of marble blocks, which passes among the natives by the name of the Tower, and is looked upon as having been part of the monument erected to Miltiades, though it may quite as well have been the τρόπαιον λίθου λευκοῦ of Pausanias. To the south of Sorós, and in the direction of Argaliki, five or six similar masses of ruins again occur, amongst which I observed a quadrangular pediment of somewhat considerable size, in company with some ambiguous fragments of columns, and several remains of architectural ornaments of the Ionic order. Was this perchance the site of an Heroon to the fallen warriors? Leake calls the spot Válari; and, reasoning from the similarity of accent, conjectures that these ruins belong to Probálinthos; but this inference falls to the ground if regard be had to the prevalent accentuation of the word, which numbers of persons in the vicinity of the spot pronounced Valarí, or Valaría. * * * For these reasons, as well as in accordance with the series of names of places laid down by Strabo, I should be justified in placing Probálinthos to the south of the small morass at the foot of the mountains. The last remains of ancient times, which I have to notice, lie on the little island to the south-east of Sorós; they consist of pediments formed of enormous blocks of marble, of some raised spots like tumuli, and of seven or eight small columns of green-veined marble, which we may therefore conclude to be of foreign origin and more recent date.

"There are but four passes leading out of the Plain of Marathon. One to the south, winding round the Pentelikós; a second to the north, traversing Trikorythos towards Rhamnus; a third to the north-west, bending up the valley to Kaxomdriti and Oropós; and the fourth to the west, leading from Vranás across the Aphorismós to Athens. I admit there is a fifth egress, from Oinóe up the northern declivity of the Aphorismós, but this pass comes in contact with the direct road to Athens, to the east of Stamáta. All these lines are perfect mountain-passes, in which but few persons can walk abreast; there is no riding through them but on the backs of mules or ponies; and even if cavalry could make their way through them, it could not be done without infinite care and much danger; after all, too, they would be completely useless in these defiles. There are none so steep and toilsome as the two roads across the Aphorismós, which, after their junction, constitute the nearest and straightest route to Athens.

I found an obscure tradition of the Persian contest on this spot prevalent among the inhabitants of the plain. In former days, said they, during the times of the Hellenes, a swarm of Fustanellæ appeared in this plain. The Athenians, who had pitched their tents in the upper part of it, proceeded to attack them, and slew such a multitude of them that the river was dyed crimson with their blood. But it may be doubted whether this legend be an old tradition, or, as holds good of similar tales in other parts of Greece, whether it be not of modern invention. At all events, it would be very unsafe ground for anyinquirer to take in investigating the local circumstances of the battle."
—*From the Journal of Education, No. XI.*

EGYPTIAN EGG OVEN.

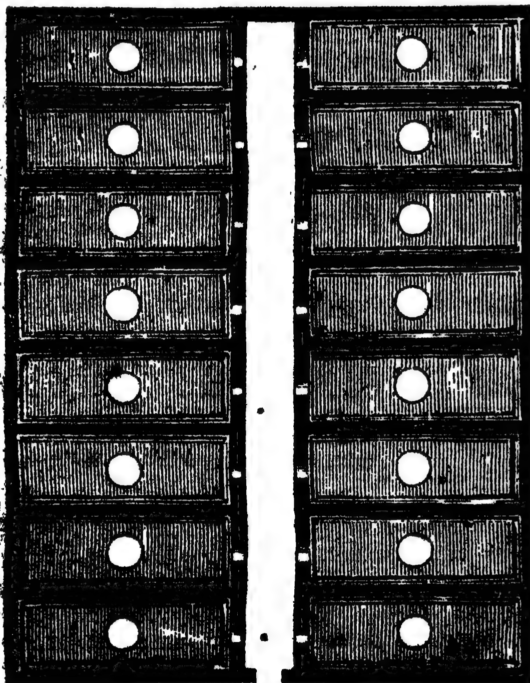
[*From "Habits of Birds."*]

It is indispensable to hatching, that an equable temperature be kept up of about 96° Fahr. or 32° Réaum., for at lower temperatures the living principle appears to

become torpid and unable to assimilate the nourishment provided for developing the embryo. Proceeding upon this principle, the Egyptians, as well as those who have tried the experiment in Europe, have succeeded by means of artificial heat in hatching eggs without any aid from the mother birds.

Modern travellers, who mention the art as practised in Egypt, are very deficient in their details; but we ought to wonder the less at this when Father Sicard informs us that it is kept a secret even in Egypt, and is only known to the inhabitants of the village of Berme, and a few adjoining places in the Delta, who leave it as an heir-loom to their children, forbidding them to impart it to strangers. When the beginning of autumn, the season most favourable for hatching, approaches, the people of this village disperse themselves over the country, each taking the management of a number of eggs intrusted to his care by those acquainted with the art.

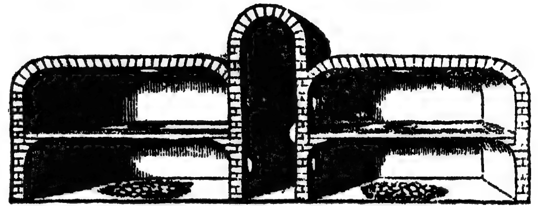
According to the best descriptions of the Egyptian *mamal*, or hatching-oven, it is a brick structure about nine feet high. The middle is formed into a gallery about three feet wide and eight feet high, extending from one end of the building to the other. This gallery forms the entrance to the oven, and commands its whole extent, facilitating the various operations indispensable for keeping the eggs at the proper degree of warmth. On each side of this gallery there is a double row of rooms, every room on the ground-floor having one over it of precisely the same dimensions, namely, three feet in height, four or five in breadth, and twelve or fifteen in length. These have a round hole for an entrance of about a foot and a half in diameter, wide enough for a man to creep through; and into each are put four or five thousand eggs. The number of rooms in one mamal varies from three to twelve; and the building is adapted, of course, for hatching from forty to eighty thousand eggs, which are not laid on the bare brick floor of the oven, but upon a mat, or bed of flax, or other non-conducting material.



Ground-plan of an Egyptian Egg-oven.

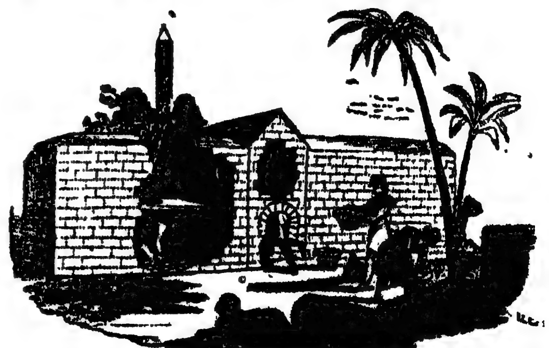
In each of the upper rooms is a fire-place for warming the lower room, the heat being communicated through a large hole in the centre. The fire-place is a sort of gutter, two inches deep and six wide, on the edge of the floor, sometimes all round, but for the most part only on two of its sides. As wood or charcoal would make too quick a fire, they burn the dung of cows or camels, mixed with straw, formed into cakes and dried. The doors which open into the gallery serve for chimneys to let out the smoke, which finally escapes through openings in the arch of the gallery itself. The fire in the gutters is only kept up, according to some, for an hour in the morning and an hour at night, which they call the dinner and supper of the chickens; while others say it is lighted four times a-day. The difference probably depends on the temperature of the weather. When the smoke of the fires has subsided, the openings into the gallery from the several rooms are carefully stuffed with bundles of coarse tow, by which the heat is more effectually confined than it could be by a wooden door.

When the fires have been continued for an indefinite number of days—eight, ten, or twelve, according to the weather—they are discontinued, the heat acquired by the ovens being then sufficient to finish the hatching, which requires in all twenty-one days, the same time as when eggs are naturally hatched by a hen. About the middle of this period a number of the eggs in the lower are moved into the upper rooms, in order to give the embryos greater facility in making their exit from the shell, than they would have if a number of eggs were piled up above them.



Transverse section and perspective elevation of an Egyptian Egg-oven.

The number of ovens dispersed in the several districts of Egypt has been estimated at 386; and this number can never be either increased or diminished without the circumstance being known, as it is indispensable for each mamal to be managed by a Bermean, none of whom are permitted to practise their art without a certified license from the Aga of Berme, who receives ten crowns for each license. If, then, we take into account that six or eight broods are annually hatched in each oven, and that each brood consists of from 40,000 to 80,000, we may conclude that the gross number of chickens which are every year hatched in Egypt amounts to nearly 100,000,000. They lay their account with losing about a third of all the eggs put into the ovens. The Bermean, indeed, guarantees only two-thirds of the eggs with which he is intrusted by the undertaker, so that out of 45,000 eggs he is obliged to return no more than 30,000 chickens. If he succeeds in hatching these, the overplus becomes his perquisite, which he adds to the sum of thirty or forty crowns, besides his board, that is paid him for his six months' work.



Egyptian Egg-oven.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

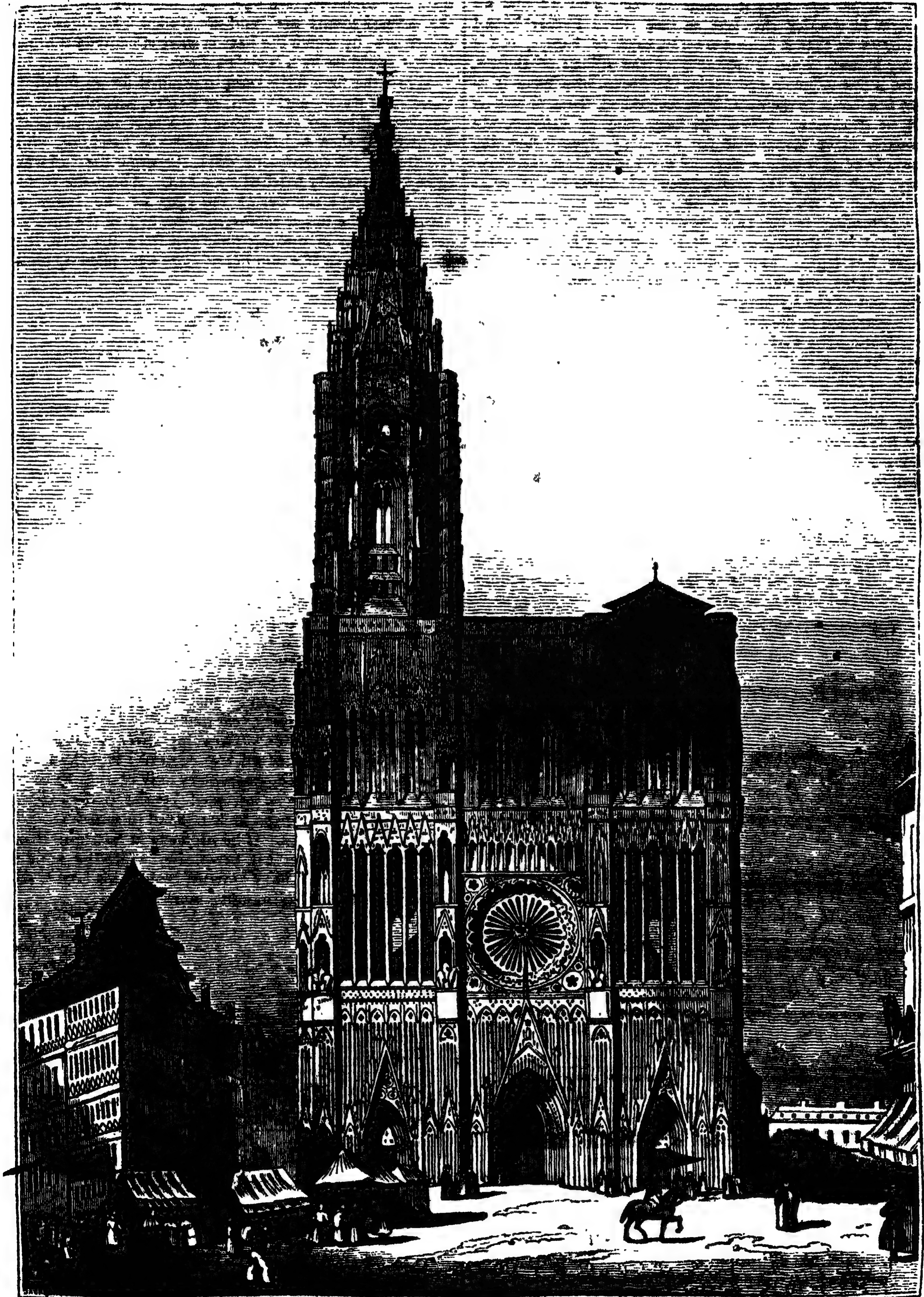
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STRASBURG CATHEDRAL.



[West Front of Strasburg Cathedral.]

The architecture of the middle ages has left us nothing greater or more wonderful than the Cathedral of Strasburg. The preceding engraving represents it as seen from the west, with its splendid spire, unrivalled in beauty as it is in height,—springing up, it may almost be said, till it disappears in the clouds. It is impossible to gaze on the far-ascending column, with its tier on tier of sculptured masonry piled in endless succession, without feeling the spirit drawn up along with it towards a higher world. There, too, it has stood unchanged for upwards of five hundred years, looking down upon all things else, constantly in motion and passing away, as if it alone, though resting on the mutable earth, were not of it, but enduring as the heaven it points to. By all its associations it calls us out of and away from this present time. It is the representative of the future, and it is also the monument of the past,—the surviving witness, in its venerable antiquity, of a long procession of revolutions and grand events which stir or dazzle men now only in the pictures of history.

The greater portion of the cathedral of Strasburg is still older than the spire; and part of it dates almost from the dawn of modern civilization. Tradition asserts that, before the country was subdued by the Roman arms, the Celts worshipped their divinity Esus, the god of war, under a tree which grew upon the spot where the cathedral now stands. This sacred tree the Romans are said to have cut down, and in its stead to have erected a temple, where the inhabitants paid their devotions to the German Hercules, whom they called Kruzmanna, the same word with the modern German Kriegeman, or warrior. The old ecclesiastical chronicles relate that the first Christian church built on the spot was erected by St. Amand, the first bishop of the Alsatians, about the middle of the fourth century. After it had stood a hundred years, it was destroyed by Attila and his Huns. From the time of the devastations of these barbarians, the place remained desolate and uninhabited till it was restored, in the commencement of the sixth century, by Clovis, king of the Franks, who also rebuilt the church, as was the fashion in those times, of wood. It was now that Strasburg received its present name, which signifies the town of the street, having been called Argentoratum by the Romans.

The present cathedral was begun about the middle of the eighth century by the French king, Pepin le Bref, and finished by his son and successor, Charlemagne. The walls of the choir still remain as they were completed by these two monarchs in that remote age. The rest of the ancient cathedral was destroyed in the war which followed the death of the emperor Otho III., in the year 1002. Their restoration was commenced in 1015, by the Bishop Werinhaire, or Werner, by whom the work was continued with great spirit till his death, in 1028, above a hundred thousand persons, it is stated, having been all that time employed, numbers of whom came from foreign countries. The wages of many of them were paid merely in pardons and indulgences. After Werner's death, however, the zeal with which the pious undertaking was prosecuted waxed faint, and the body of the church was not completed till the year 1275, being a space of two hundred and sixty years from the date of its commencement.

It still, however, wanted the crowning ornament and distinction of a Christian temple, a tower or spire. That addition immediate preparations were made to supply. On the 25th of May, 1277, the first stone of the present spire was laid by the Bishop Conrad de Lichtenberg. The designer and master-builder was Ervin de Steinbach, who, by this creation of his genius, has shown himself to have been one of the greatest architects that ever existed. His design, however, as appears from the original still preserved in the cathedral, differed from the one which has been actually executed, inasmuch as it embraced the erection of two spires, one over each extremity of the western façade, whereas only that to the north has been erected. Ervin de Steinbach died in 1318, and was succeeded as master-builder by his son John, who superintended the work till his death, in 1339. The spire was not finished till 1438, having thus been the work of a hundred and sixty-one years. The architect who brought the work to a conclusion was John Hültz, who survived to enjoy the reputation which it brought him till the year 1449.

Very different accounts have been given of the height of the spire of Strasburg Cathedral; some so extravagant that they have extended it to twice what it actually is. According to a work, entitled "Description de la Cathédral de Strasbourg," printed in that city in 1817, being an enlarged and corrected edition of a former publication, by a writer of the name of François Miler, the most accurate measurement makes it about four hundred and ninety-four feet high, being within thirty feet of the height of the largest of the Egyptian pyramids. It is said that, in Ervin de Steinbach's original design, each of the two towers which he proposed to erect is raised a hundred feet beyond this height.

The single spire which the building possesses rises, as has been mentioned, from the northern end of the west front, and surmounts one of the three great doors by which that façade is pierced. Besides its unsurpassed elevation, the structure has all the other characters of a perfect work. Nothing can be conceived more wonderful than the consummate art by which the architect has combined the greatest strength with the most admirable lightness and airiness. The masonry does not present to the eye a solid mass, but is almost from the base to the summit a succession of columns and arches with openings between, springing up as if, instead of being supported by, they grew out of each other. The outline of the whole, at the same time, is one of faultless beauty, while the ornamental sculpturing throughout is so rich and delicate that its appearance has been usually compared to that of lace. "The ancient architects," says the French writer Laugier, in his 'Essai sur l'Architecture,' "excelled in the construction of spires. They seized in a marvellous manner the spirit of that sort of work, and carried to the utmost length the artifices upon which it depends. They possessed the secret of uniting in their erections lightness and delicacy of workmanship to elegance of form; and, avoiding equally the over-attenuated and the over-massive, they attained the precise point in which consists the true beauty of this description of building. Nothing of this kind is to be compared to the spire of the Cathedral of Strasburg. This superb pyramid is a masterpiece of skill, ravishing our senses at once by its prodigious elevation, the exactness of its gradual diminution, its pleasing shape, the justness of its proportion, and the exquisite finish of its workmanship. I do not believe that any architect ever produced a work so boldly imagined, so felicitously conceived, and so admirably executed. There is more art and genius in this one performance than in all else that we have most wonderful in architecture."

The cathedral of Strasburg stands in what is called the Place du Dôme, which is the highest ground in the city; and a tolerably complete view of the east end may be obtained from the square. The surrounding houses press rather close upon it in other parts; and indeed the north and south sides are hidden for nearly their whole length by rows of shops, which were only in the latter part of the last century detached from the very walls of the sacred edifice. It consists of a nave and choir, without a transept, the breadth, however, being enlarged at the choir by the contiguity of several chapels dedicated to particular saints, and other apartments. The entire length of the interior from east to west is about three

hundred and fifty-five feet; the breadth of the nave one hundred and thirty-two, and its height seventy-two. The choir, which is as usual separated from the nave by a screen, is also raised about twelve or fifteen feet above it. The nave is separated from its side aisles by two rows of nine pillars each, which are so massive that the largest is seventy-two feet in circumference. The windows which range along the north and south walls are filled with painted glass; and over the middle or principal entrance in the west end there is what is called a rose window of forty-eight feet in diameter, of exquisite richness and beauty. The magnificence of the interior of the church is further increased by many noble paintings, the productions of some of the greatest of the old masters, which cover the walls.

One of the wonders of this cathedral is its famous clock. This surprising piece of mechanism, which when perfect excelled every other work of the kind in existence, is fixed in an apartment on the south side of the choir. Its contriver was Conrad Dasypodius, professor of mathematics in the university of Strasburg, and under his superintendence it was finished in the space of about three years, having been begun in May, 1571, and completed on the 24th of June, 1574. Besides showing the hours, it used to exhibit, on a revolving globe, the movements of the heavenly bodies throughout the year, with many other curious results. Among its other appendages was an automaton cock, which had belonged to the old clock of the cathedral, made in 1352, and seems, by the accounts which are given of it, to have been a most ingenious piece of mechanism. On the arrival of every successive hour, we are told, it flapped its wings, stretched forth its neck, and crowed twice. But being struck with lightning in 1625, and again in 1630, it never afterwards could be brought to go through these manœuvres except at noon of Sundays and holydays. It is now, with every other part of the clock, to use the words of the French account we have above referred to, quite dumb and dead.

The Beguine Nuns.—While at Ghent, ill as he was, Gooch contrived to visit the Beguinage there, and in one of his letters gives an account of the evening service in the chapel:—"When we entered it was nearly dark: the only lights were a few tall tapers before the altar, and as many at the opposite extremity of the chapel, before the organ; the rest of the building was in deep gloom, having no other light than what it received from these few and distant tapers. There were a few people of the town kneeling on straw chairs in the open space before the altar, but the rest of the chapel was filled on each side from end to end by the Beguine nuns, amounting to several hundreds, all in their dark russet gowns and stiff white hoods; and all in twilight, and deep silence, and motionless, and the silence interrupted only by the occasional tinkling of a bell, or by a nun starting up with outstretched arms in the attitude of the crucifixion, in which she remained fixed and silent for many minutes. It was the strangest and most unearthly scene I ever beheld." The Beguines, like the Sœurs de Charité, act as nurses to the sick poor in the hospitals; and the best of nurses they make, combining more intelligence than can be found among the uneducated classes, with a high sense of duty.—*Lives of British Physicians.—Gooch.*

Mental Exercise.—By looking into physical causes our minds are opened and enlarged; and in this pursuit, whether we take or whether we love the game, the chase is certainly of service.—*Burke.*

Diet of the Corfiots, or inhabitants of Corfu.—A Corfiot is a very abstemious person, when he eats or drinks at his own expense; but when he feasts at that of a foreigner, he is capable of consuming a vast quantity of food both animal and vegetable, together with copious libations of wine. I have seen both males and females of the higher orders swallow a portion of every dish and every wine within their reach, on a supper-table laid for two hundred persons; but in their own houses their fare is much more simple and limited. In the Greek church there are no fewer than four Lents, which occupy one hundred and ninety-one days of the year; in some of them even fish is proscribed, and bread and vegetables are alone tolerated. The estimate for the food of a peasant is about two pounds of Indian corn per day, made into coarse bread, and seasoned by a few leeks, wild herbs, or cloves of garlic, with a little oil and vinegar, and washed down with some water or weak wine, which they denominate "vinetto." On gala days, some caviare or a morsel of salt fish adds an additional zest to the meal. On this fare the peasant labours a whole day in the fields; he rises early, swallows a glass of spirits, eats one-half of his provisions at noon, the remainder at the close of the day, and he then retires to repose for the night in the same garments which he has laboured in. Fish, especially shell-fish, are much used in the town. Coffee also is in general use among the better orders, and of course luxurious living is more common among them; but, generally speaking, the Corfiots, of whatever rank, as well as the mass of the Greek nation, may be fairly called abstemious in their domestic habits. The late Dr. Clarke imbibed a notion, which he states with considerable confidence in his travels, (vol. iii., 8vo. edition, page 255) viz., that eggs, butter, and milk, were considered so unwholesome in Greece, as to be called the three poisons; this statement is somewhat overcharged, at least as it regards the islands. They are neither unwholesome, nor are they *generally* considered so. Cow's milk is not much esteemed, but goat's milk is in very general use, and it is very good of its kind: a good deal of butter is made from it, and cheese in abundance. Salt butter, imported from England, is in very common use among those who can afford it; and a manufactory of fresh butter from the milk of cows has long existed at St. Salvador. The eggs are particularly good, and in universal use by all who can procure them. So far are they from being considered unwholesome, that Dr. Mordo mentions the use of eggs by convalescents as an improvement in the Corfiot practice of physic; and he attributes the better state of health of the Corfiots in his time, to what it had formerly been, among other things, to the more abundant use of milk.—*Hennen's Medical Topography of the Mediterranean.*

Tortoises.—From a document belonging to the archives of the cathedral, called the 'Bishop's Barn,' it is well ascertained that the tortoise at Peterborough must have been about two hundred and twenty years old. Bishop Marsh's predecessor in the see of Peterborough had remembered it above sixty years, and could recognize no visible change. He was the seventh bishop who had worn the mitre during its sojourn there. If I mistake not, its sustenance and abode were provided for in this document. Its shell was perforated, in order to attach it to a tree, &c., to limit its ravages among the strawberry borders. The animal had its antipathies and predilections. It would eat endive, green pease, and even the leek; while it positively rejected asparagus, parsley, and spinage. In the early part of the season its favourite pabulum (food) was the flowers of the dandelion (leontodon taraxacum), of which it would devour *twenty* at a meal: and lettuce (lactuca sativa), of the latter a good-sized one at a time: but if placed between lettuce and the flowers of the dandelion, it would forsake the former for the latter. It was also partial to the pulp of an orange, which it sucked greedily. About the latter end of June, (discerning the times and the seasons,) it looked out for fruit, when its former choice was forsaken. It ate currants, raspberries, pears, apples, peaches, nectarines, &c., the riper the better, but would not taste cherries. Of fruits, however, the strawberry and gooseberry were the most esteemed: it made great havoc among the strawberry borders, and would take a pint of gooseberries at intervals. The gardener told me it knew him well, the hand that generally fed it, and would watch him attentively at the gooseberry-bush, where it was sure to take its station while he plucked the fruit. I could not get it to take the root of the dandelion, nor, indeed, any root I offered it, as that of the carrot, turnip, &c. All animal food was discarded, nor would it take any liquid, at least neither milk nor water; and when a leaf was moist, it would shake it to expel the adhering wet. This animal moved with apparent ease, though pressed by a weight of eighteen stone: itself weighed thirteen and a half pounds. In cloudy weather it would scoop out a cavity, generally in a southern exposure, where it reposed, torpid and inactive, until the genial influence of the sun roused it from its slumber. When in this state the eyes were closed, and the head and neck a little contracted, though not drawn

within the shell. Its sense of smelling was so acute, that it was roused from its lethargy if any person approached even at a distance of twelve feet. About the beginning of October, or the latter end of September, it began to immure itself, and had for that purpose, for many years, selected a particular angle of the garden; it entered in an inclined plane, excavating the earth in the manner of the mole: the depth to which it penetrated varied with the character of the approaching season, being from one to two feet, according as the winter was mild or severe. It may be added, that for nearly a month prior to this entry into its dormitory, it refused all sustenance whatever. The animal emerged about the end of April, and remained for at least a fortnight before it ventured on taking any species of food. Its skin was not perceptibly cold: its respiration, entirely effected through the nostrils, was languid. I visited the animal, for the last time, on the 9th of June, 1813, during a thunder storm; it then lay under the shelter of a cauliflower, and apparently torpid.—*Murray's Experimental Researches, quoted in Sir W. Jardine's Edition of White's Selborne.*

THE CITY OF YORK.



[View of the City of York.]

York was certainly a Roman, and, in all probability, was previously a British town, if so we may call one of those collections of huts occupying a cleared-out spot in the midst of the woods, which were the only towns our island had to boast of when in the possession of its first proprietors.* The station or settlement, it is most likely, derived its name from the river on the banks of which it was placed, now the Ouse or Oose, but anciently the Oure or Oore, a sound which seems evidently to be present in Eb-*or*-acum, the Latinized form used by the Romans. The *orac* of Eboracum again is no doubt the origin of the modern York.

The Ouse flows through the city of York, the principal part of which, however, stands on the left or east bank of the river, immediately above its junction with the smaller stream called the Foss. Vessels of ninety tons burden can still ascend the Ouse as far as York; but in former times that city used to be accounted one of the chief marts of foreign commerce in the kingdom. From the foundation, however, of the port of Hull by Edward I. towards the close of the thirteenth century, the trade and commercial importance of York began rapidly to decline.

The latter place, nevertheless, retained for a long time after not merely the nominal rank, but the real consequence, of one of the principal towns in the kingdom. York is still the only city in England, except London, whose mayor enjoys the title of lord, for which, among other reasons, it claims to stand next in dignity to the metropolis, and to be accounted the second city in the realm. In the Roman times, however, it may be said to have been, more than London, the capital of the island. The Roman emperors who visited this country for the most part took up their residence at York. Here the emperor Severus died in the year 211, after having made York his head-quarters during the three or four preceding years which he spent in the island. Three remarkable mounts, a little west from the city, still bear the name of the Hills of Severus: and many other remains that have been discovered in later ages attest the Roman domination. After the establishment of the Saxon Heptarchy, York became the capital of the kingdom of Northumberland. Although, on the arrival of the Normans, this district, like the rest of the kingdom, quietly submitted in the first instance to the invaders, it was the scene on which, soon afterwards, a struggle was made by a powerful confederacy of Saxon lords and their retainers to regain their independence. This insurrection, however, was soon crushed by the activity and energy of the conqueror, who, laying siege to York, starved it into a surrender in six months, and then, after his usual fashion, erected a fortress in the close neighbourhood of the town, to keep it for the future in awe. This was the origin of the present castle, situated at the southern

extremity of the city, in the angle formed by the confluence of the two rivers. At a little distance is a ruin called Clifford's Tower, which was the keep of the old castle, and took its name from the Cliffords, whom William appointed the first governors of that stronghold. In early times parliaments were frequently held at York; and in 1299, Edward I. even removed the courts of law from London to this city, where they continued to sit for seven years.

The city of York stands in the midst of an extensive plain, the largest certainly in Great Britain, if not, as has been sometimes asserted, in Europe. Viewed from the immediate neighbourhood, the peculiarity which most strikes the eye is the ancient wall by which it is encompassed,—supposed to have been built by Edward I., about 1280, on the line of the old Roman fortification. This wall, which had fallen greatly into decay, never having recovered from the damage it sustained when the city was besieged by Sir Thomas Fairfax and General Lesley, in 1644, has been lately repaired, and a walk is now formed along the top of part of it, which is a favourite resort of the inhabitants.

Seen from a greater distance, York presents a crowd of pointed spires shooting up from the midst of the houses, the indications of those numerous parish churches of which it still retains twenty-three out of forty-two which it formerly possessed. Far above all these, however, rise the enormous bulk and lofty towers of the Minster, which stands in the north part of the city, and to the east of the river. In the opposite quarter is the Castle, a large building, erected about the beginning of the last century, on the site of the Conqueror's Fortress, and serving as a prison for criminals and debtors. Beside the County Prison are the County Hall and the Courts of Assize. The other principal public buildings are the Mansion House, an elegant structure, erected in 1725; the Guildhall, which dates from the middle of the fifteenth century, and is one of the finest Gothic rooms in England, being ninety-six feet in length by forty-three in breadth and twenty-nine and a half in height; the Council Chamber, built in 1819; the Assembly Rooms, built in 1730; the Theatre, first opened in 1769, and thoroughly repaired in 1822; together with the County Lunatic Asylum, the establishment of the same kind belonging to the Society of Friends called the Retreat, the County Hospital, the New City Gaol, the New City House of Correction, &c. The Archbishop of York has no house in the city, the only residence attached to the see being the Palace at Bishopsthorpe, which stands on the west bank of the Ouse, about three miles farther down the river.

The entire circuit of the walls of York is about three miles and three-quarters, being somewhat less than that of the walls of the City of London. The space within, however, is much less densely occupied by streets and houses than it is in London. In 1831 the population was 25,359, having increased to that amount from 20,787 in the preceding ten years. The streets of York used formerly to be for the most part extremely narrow—many of the houses being built of wood, and, according to the common fashion of that style of architecture, often overhanging the road below with their upper stories. Many of these ancient edifices, however, have been taken down of late years, and the principal streets widened and otherwise improved. Still the city, in almost every part, wears a look of other times; and could no more be mistaken for a modern town, notwithstanding the modern comforts and elegances that are to be found here and there interspersed among the relics of the past, than an ancient lady could be mistaken for her grand-daughter because she may be attired in a gown or head-dress of the same fashion.

Among the most important of the recent alterations and repairs which have taken place in York, are to be reckoned those connected with the two rivers on the banks of which it stands. The Fors has been changed from little better than a stagnant ditch, into a clear and ornamental stream; and the navigation of the Ouse, which had been long neglected, has also been greatly improved since the commencement of the present century. New bridges have likewise been thrown over both rivers; that over the Fors being a single arch, and that over the Ouse consisting of three elliptical arches, of which the centre one is seventy-five, and each of the others sixty-five feet in span. The old bridge which crossed the Fors, was erected about the beginning of the fifteenth century; that of the Ouse is supposed to have been built at the expense of the Archbishop Walter Grey, about the year 1235. It consisted of five pointed arches, as it may be seen depicted in "Drake's Antiquities of the City of York." The centre arch was supposed to be the largest in Europe, with the exception of that of the Rialto, at Venice. A gravelled walk was some years ago formed for about a mile along the left bank of the river, immediately to the south of the bridge, which, being now shaded with lofty elms, and having become a fashionable promenade, is one of the greatest ornaments of the city.

In a description of York, its ancient gates ought not to be forgotten. They are four in number, namely, Micklegate Bar to the south-west, over the entry from London; Walmgate Bar to the south-east, Monk Bar to the north-east, and Bootham Bar to the north-west, facing the great road from Scotland. All these structures are at least as old as the thirteenth century; and the inner arch of the Micklegate Bar, which is a portion of a circle, has been supposed to be of the Roman times. Besides the four principal gates, there were formerly also five posterns, or smaller and more private entrances; but two of them, the Skeldergate and Castlegate posterns, have, within these few years, been taken down.

The chief glory of this city, however, is its noble cathedral, of which we gave an account in a former number. In the possession of this grandest of all our ecclesiastical edifices, York, notwithstanding all that it has lost, may be said still to retain, unimpaired, the proudest feature of its ancient importance and splendour.

OLD TRAVELLERS.—MARCO POLO.—No. 2.

The indefatigable Italians pursued their course directly to Khoten, another city of great celebrity and trade, where very valuable chalcedonies, jaspers, and other precious stones were found. Though now far within the dominions of the great khan, they were still far from having surmounted all their difficulties and dangers. They had to toil across the great desert of Kobi,—called by the Mongul Tartars "the Hungry Desert." The horrid nature of this immense, barren, sandy tract, and the difficulties of crossing it, have been sufficiently confirmed by more recent travellers, particularly by the accurate John Bell of Antermony, who in 1720 traversed another part of it in the suite of a Russian ambassador sent by Peter the Great to China; but Marco wrote in a superstitious age, and taking with too much faith the marvellous relations of the ignorant Tartars, he crowded the desert with all sorts of imaginary horrors, some of which may be reduced to the natural phenomena of the *mirage*, whilst others—such as the malignant spirits that decoyed the travellers from their path, and left them to perish of hunger in untrodden solitudes, and that filled the air "with the sounds of all kinds of musical instruments, and also of drums and the clash of arms," may be safely assigned to the effects of the winds and to fancy. Marco does not forget to make proper mention of the inestimable services of the camel in deserts like these. They were thirty days journeying across the Hungry Desert,

after which they came to Scha-cheu, or "the City of the Sands," where they found among the idolatrous population a few Nestorian Christians and Mahometans,—one of the many curious proofs afforded by Marco that both those religions had penetrated into the most remote regions of the earth, where Europeans little thought they existed.

From the City of the Sands they travelled to Kancheu, now considered as being within the boundary of China Proper, but then belonging to the very comprehensive district of Tangut. Marco, on his way, describes the asbestos, which he found woven into cloth that was incombustible like the famous salamander. As this curious fossil or earthy mineral was little known at the time in the south of Europe, Marco's description of it was held as one of those things for which he had drawn on his imagination. That description, however, was perfectly veracious and correct. "The fossil substance," says the honest Venetian, "which is procured from the mountains, consists of fibres not unlike those of wool. This, after being exposed to the sun to dry, is pounded in a brass mortar, and is then washed until all the earthy particles are separated. The fibres thus cleansed and detached from each other, they then spin into thread, and weave into cloth. In order to render the texture white, they put it into the fire, and suffer it to remain there about an hour; when they draw it out uninjured by the flame and become white as snow. By the same process they afterwards cleanse it when it happens to contract spots, no other abstergent lotion than an igneous one being ever applied to it." Marco adds with great simplicity,—"Of the salamander under the form of a serpent, supposed to exist in fire, I could never discover any traces in the eastern regions."

At the same part of his travels Marco also describes the country that produces rhubarb,—a valuable drug which had long been known in medicine, though few Europeans in those days knew whence it was brought*.

At Kan-cheu, on the borders of China Proper, the travellers were detained a whole year. So long a time had elapsed since the father and uncle of Marco had left China as Kublai's ambassadors that they were forgotten; the Khan, moreover, happened to be in a distant part of his immense dominions, and for some months heard nothing of the detention of his Italian friends on the frontiers. As soon, however, as he was informed of that circumstance, he commanded that the state mandarins should take charge of the Poli, show them all the honours due to ambassadors, and forward them to his presence, at his expense. At Yen-king, near the spot where Peking now stands, the travellers, after a journey that had occupied no less time than three years and a half, "were honourably and graciously received, by the Grand Khan, in a full assembly of his principal officers." They performed the *cotou*, or nine prostrations, as they are now practised in the Chinese court, and Marco's father and uncle then rising, related, "in perspicuous language," all that they had done since their departure, and all that had happened to them, the khan listening "with attentive silence." The letters and presents of the pope were next laid before the tolerant Tartar conqueror, who, it is said, received with peculiar reverence some oil from the Holy Sepulchre at Jerusalem. The khan was then struck with the appearance of young Marco, whom he had noticed, and asked who he was. "Nicolo Polo," says Marco, who speaks of himself in the third person, "made answer that the youth was his son, and the servant of his majesty, when the grand khan condescended to take him under his protection, and caused him to be immediately enrolled amongst his attendants of honour. In consequence of this distinguished notice he was held in high estimation and respect by all belonging to the court. He learned in a short time and adopted the manners of the Tartars, and acquired a proficiency in four different languages, which he became qualified to read and write." These languages probably were the Mongul, Ighur, Manchu-Tartar, and Chinese. As soon as he had acquired the languages necessary for his functions, he was actively employed in affairs of great importance by Kublai, who, in the first place, sent him on a mission to Karazan, (Khorasan or Kharism,—geographers are not decided which,) at the distance of six months' journey from the imperial residence. He acquitted himself with wisdom and prudence.

The favour of the Poli at the court of the Tartar conqueror was also increased by Marco's father and uncle, who soon after their arrival suggested the employment of catapultæ, or battering machines, against Siang-yang-fu, an important city where the Chinese still held out against the Tartars, the siege of that place having lasted three years. The catapultæ were constructed under the superintendence of the brothers; and when employed on the walls of Siang-yang-fu, that city soon fell.

"Marco, on his part," again to use his own words, "perceiving that the Grand Khan took a pleasure in hearing accounts of whatever was new to him respecting the customs and manners of people, and the peculiar circumstances of distant countries, endeavoured, wherever he went, to obtain correct information on these subjects, and made notes of all he saw and heard, in order to gratify the curiosity of his master. In short, during seventeen years that he continued in his service, he rendered himself so useful, that he was employed on confidential missions to every part of the empire and its dependencies; and sometimes also he travelled on his own private account, but always with the consent and sanctioned by the authority of the Grand Khan. Under such circumstances it was that Marco Polo had the opportunity of acquiring a knowledge, either by his own observation or what he collected from others, of so many things until his time unknown, respecting the eastern parts of the world, and which he diligently and regularly committed to writing, as in the sequel will appear." This is only a frank and fair exposition of the rare advantages that the Venetian traveller enjoyed.

So high did Marco Polo rise in the estimation and favour of the liberal-minded Kublai, who (unlike the sovereigns who preceded and followed him on the throne of China) readily employed Arabians, Persians, and other foreigners, that when a member of one of the great tribunals was unable to proceed to the government of a city for which he had been nominated, the emperor sent the young Venetian in his stead. Marco mentions this honourable event of his life in the most modest manner, and only incidentally while describing the said city, which was Yang-cheu-fu in the province of Kiang-nan, a place then of great importance, having twenty-seven towns under its jurisdiction. These are the Venetian's words, and the only allusion he makes to the subject: "The people are idolaters, and subsist by

* Rhubarb, called by the Chinese *ta-hoang* or "yellow root," is found in many parts of Tartary and Thibet, but the best grows in China Proper near the great wall. We glean the following curious particulars from John Bell of Antermony:—

"It appears that the Monguls never accounted rhubarb worth cultivating, but that the world is obliged to the marmots for the quantities, scattered at random, in many parts of their country. (He has mentioned before, that wherever you see ten or twenty plants of rhubarb, you are sure of finding several burrows of marmots under the shade of their broad-spreading leaves.) For whatever part of the ripe seed happens to be blown among the thick grass, can very seldom reach the ground, but must there wither and die; whereas, should it fall among the loose earth, thrown up by the marmots, it immediately takes root, and produces a new plant. After digging and gathering the rhubarb, the Monguls cut the large roots into small pieces, in order to make them dry more readily. In the middle of every piece they scoop a hole, through which a cord is drawn, in order to suspend them in any convenient place. They hang them, for most part, about their tents, *and sometimes on the horns of their sheep.*"

trade and manual arts. They manufacture arms and all sorts of warlike accoutrements, in consequence of which many troops are stationed in this part of the country. The city is the place of residence of one of the twelve nobles before spoken of, who are appointed by his majesty to the government of the provinces; and in the room of one of these, Marco Polo, by special order of his majesty, acted as governor of this city during the space of three years." Our readers must be reminded that, by a fundamental law of the empire, no viceroy or governor can retain the government of one place for a longer period than three years.

Though loaded with honours and enriched, the Poli, after seventeen years' residence in China, were forcibly moved by the natural desire of revisiting their native country. Their protector Kublai was now stricken with years and infirmities;—his death might leave them exposed to a less liberal and less unprejudiced successor; and Marco's father and uncle were themselves far advanced in age, and might well feel an ardent longing to leave their mortal remains in the beautiful city of the Adriatic which had given them birth. They spoke to the venerable emperor, whose answer was negative, and decided, and not unmixed with reproach. "If they wanted more wealth," said he, "he was ready to gratify them to the utmost extent of their wishes; but with the subject of their request he could not comply."

The Venetians had no hopes of conquering Kublai's pertinacity, when the following curious circumstance came to their aid:—

Arghun, a Mogul Tartar prince, who ruled in Persia, and who was the grand nephew of the emperor Kublai, lost his principal wife, who was also of the imperial stock. To replace her, he sent an embassy to China to solicit Kublai for another princess of their own common lineage. Kublai readily consented, and selected from his numerous grand-children a beautiful girl who had attained her seventeenth year. The betrothed queen set out with the ambassadors and a splendid retinue, for Persia; but after travelling several months, (owing to fresh wars that had broken out among the Tartars,) the turbulent state of some countries through which they had to pass prevented their progress, and they were obliged to return to the Chinese capital.

During the matrimonial negociations, Marco Polo, whose passion for travelling increased with his means of gratifying it, was absent, on the emperor's business, in the Indian Ocean; but he happened to return to China with the small fleet under his command just as the affianced princess found herself in this uncomfortable dilemma. Marco boldly proposed that she should be carried to her husband by sea,—an idea that never could have struck the Chinese, who were timid navigators, or the Tartars, who were altogether ignorant of navigation. He described, from his own recent experience, the India Ocean—which was deemed so perilous—as safe and easily navigable. The ambassadors from Persia, who had now been three years on their mission, were as anxious to return to their native country as the Poli were to return to Venice, and no sooner had Marco's observations reached their ears than they sought a conference with him. His representations dissipated all their doubts, and, it appears, the fears of the princess. He engaged he would carry them to the Persian Gulf at much less risk, expense, and in less time, than the overland journey would cost them. But nothing could be done without the emperor's permission.

"Should his Majesty," says Marco, "incline to give his consent, the ambassadors were then to urge him to suffer the three Europeans (the Poli), as being all persons well skilled in the practice of navigation, to accompany them, until they should reach the territory of King Arghun. The Grand Khan, upon receiving this application, showed by his countenance that it was exceedingly displeasing to him, averse as he was to parting with the Venetians. Feeling, nevertheless, that he could not with propriety do otherwise than consent, he yielded to their entreaty. Had it not been that he found himself constrained by the importance and urgency of this peculiar case, they would never have obtained permission to withdraw themselves from his service. He sent for them, however, and addressed them with much kindness and condescension, assuring them of his regard, and requiring from them a promise that, when they should have resided some time in Europe, and with their own family, they would return to him once more. With this object in view he caused them to be furnished with the golden tablet (or royal passport), which contained his order for their having free and safe conduct through every part of his dominions, with the needful supplies for themselves and their attendants. He likewise gave them authority to act in the capacity of his ambassadors to the Pope, the Kings of France and Spain, and the other Christian Princes."

[To be continued.]

HEMP.

Hemp is now almost universally cultivated, finding a congenial soil in nearly all parts of the world. It is a plant of the temperate climates, but it will thrive in very cold regions; and although hot countries are not favourable to its growth, yet as it is but a short time in the ground, it may be cultivated in any place that is habitable by man.

It is grown in Persia, Egypt, and various parts of the East Indies; in Africa, in the United States of America, in Canada, and Nova Scotia. Marco Polo mentions that hemp and flax, as well as great quantities of cotton, were cultivated in his time in the neighbourhood of Kashgar in the lesser Bucharia, and in the province of Khoten in Chinese Tartary. According to Mr. Clarke Abel, in China proper, though the *Xing-ma* (*Sida tiliæfolia*) is preferred for cordage, the *Gĕ ma* (*Cannabis sativa*, or hemp) is also cultivated and manufactured into ropes. At Tung-chow, that distinguished naturalist saw the *sida* and *cannabis* growing together, the first in long ridges or in fields like the millet, the second in small patches.

Dampier was told that the Spaniards at Leon in South America made cordage of hemp, but he saw no manufactory. Thunberg, on a journey from the Cape of Good Hope into the interior of Africa, found the Hottentots cultivating hemp (*Cannabis sativa*). "This is a plant," says he, "universally used in this country, though for a purpose very different from that to which it is applied by the industrious Europeans. The Hottentot loves nothing so well as tobacco, and with no other thing can he be so easily enticed into servitude; but for smoking he finds tobacco not sufficiently strong, and therefore mixes it with hemp chopped very fine."

Hemp is cultivated in Great Britain and Ireland, but not very abundantly. The counties of England in which it is principally grown are, Suffolk, Yorkshire, Somersetshire, and the fens of Lincolnshire; in Norfolk and Dorsetshire some few hemp grounds are likewise to be seen. Hemp is likewise raised in various parts of France, Spain, Denmark, and Sweden, in Wallachia and Moldavia, and in several of the Italian states; but with the exception of Italy, which affords a trifling export, and of Wallachia and Moldavia that supply the Turkish fleet with cordage, none of these countries produce it in sufficient abundance for their own consumption. Among the Italian states the kingdom of Naples is very productive of this useful vegetable substance.

A very considerable quantity is grown in the Terra di Lavoro and the districts in the immediate neighbourhood of the capital of that kingdom. In 1827 there were many fields of immense extent lying a little in the rear

of the swampy shore that extends between the mouth of the river Volturnus and Cape Misenum, devoted to this produce. On account of the very disagreeable effluvia proceeding from the hemp while macerating, and from an idea that it is obnoxious both to the water and the atmosphere, the Neapolitan government has appointed the Lago d'Agnano (a small lake beautifully situated, about a mile in circumference, and between three and four miles from the city of Naples) for this purpose; nor are the growers allowed to steep their hemp in any other place. Those who happen to raise the plant in thinly inhabited places where there is water at hand, as near the swampy shore we have mentioned, put it through the process of maceration on the spot, but the prohibition by law extends to all places within a circuit of many miles, except the Lago d'Agnano. To reach that lake the greater part of the hemp has to pass through the city of Naples; and as the cars on which it is transported are of great magnitude, and many streets of the capital are narrow, and all of them crowded, the cars are not permitted to enter the town until one or two hours after midnight. Every person who has resided at Naples during the summer must have been made sensible of the very considerable quantity of hemp grown in the neighbourhood, by seeing, day after day, the long lines of cars laden with it stationed at three of the four great avenues to the city waiting the appointed hour; and by having his rest broken night after night by the rumbling noise made by these numerous and heavy vehicles as they roll over the lava-paved streets of the town towards the grotto of Posilippo and the lake. In the long subterranean road or tunnel of Posilippo, through which also they must of necessity pass, there being no other communication, the noise they make is astounding. What with going, and returning after the hemp has been macerated, the inhabitants of a considerable part of the city of Naples are regaled with this nocturnal music for more than two months every year.

The grand mart, however, for hemp as an article of commerce, is Russia, where it is grown in immense quantities and of the best quality. The principal places of its cultivation are in the southern and western provinces bordering upon Poland, and in the provinces of Poland which belong to Russia. The plant even grows wild in some parts of Russia. In Siberia and about the river Volga it is found flourishing in natural vigour near spots where towns have formerly stood. The Cossack and Tartar women gather it in considerable quantities in autumn, when it has shed its seed and begins to die away. It is not, however, collected by them for its fibres, but is used, as by some other eastern people, as an article of food, for which it is prepared in various ways*.

Much anxiety was evinced some years since in this country that we should obtain supplies of hemp from our own dependencies, and its cultivation was very much encouraged at Canada. The attention of the planters being strongly called to it, several samples of hemp of Canadian growth were sent home. These were placed under the examination of the best judges, by whom they were considered defective, rather from the faulty mode of preparation than from any inferiority in the material itself. Some was found to be of as great a length as the Italian hemp, which is longer than that from the Baltic, but the whole was mixed together without any regard to length or quality. The Petersburgh hemp, on the contrary, is always carefully assorted into different classes, which of course obtain very different prices in the market. It was supposed that the Canadian planters would have readily attained to better methods of preparing and assorting, but they have not yet been able to compete with the Russian cultivators, who still exclusively supply our market. At the latter end of the last century, in consequence of our extensive warfare, the importation of this article into England very much increased. For the five years ending with 1776 the average annual quantity was 246,573 cwt.; in the same number of years ending with 1799 the annual average is found to be more than double that quantity, being 573,358 cwt. It is calculated that the sails and cordage of a first-rate man-of-war require 180,000 lbs. of rough hemp for their construction. During a time of peace, therefore, the demand for hemp is much less than in a period of war, and accordingly we find that the average importation of the last five years is very nearly the same as that in 1799; but an average taken after the lapse of so many years, if the circumstances of each period were perfectly similar as to our foreign relations, should show a great increase, in accordance with the rapid progress of population and manufactures.

We learn from the Annals of Agriculture, that in the year 1785 the quantity of hemp exported from Petersburgh to England alone, amounted to 353,900 cwt.; and assuming that it requires five acres of ground to produce a ton of hemp, the whole space of ground requisite for raising the above quantity would amount to 88,475 acres. Since that period it has been much more extensively grown in Russia. We find that in 1799 about 600,000 cwt. were exported in British ships from St. Petersburgh.

* Pallas' Travels, tom. i. p. 356, tom. iii. p. 266.



[Common Hemp.—Cannabis sativa.]

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THE UPAS.



[The Upas Tree.]

We fancy there are but few of our readers whose imaginations, at least in childhood, have not been delighted yet terrified by the popular account of that most wonderful tree called the Upas. The fabulous account of this tree was probably first introduced by some Dutch soldiers or seamen into Europe, where it was long current and received with greater or less faith; but the story rested upon no better authority, till one Foersch, about the year 1783, published a detailed description of the Upas, which more than confirmed all the wonderful things that had been told of it.

In 1785 his description was inserted in a respectable English periodical work, the "London Magazine," with implicit faith, and this article continued to be the source whence our instructors of children chiefly drew their information. Though the whole story may be fresh in the memory of our readers, we will briefly mention its principal points, to show how they bear on the real existence and nature of a poison-tree that is actually found growing in Java, and what an imposing fabric of fiction has been raised on the simple ground-work of truth.

Foersch, who had been only third surgeon to the Dutch forces at Samarang, a settlement on the coast of Java, says, that in 1775-6, having attained to the rank

of principal surgeon, he determined to travel into the interior of the island, which, he says, had been little visited by Europeans. One of his objects was to obtain accurate information concerning the tree called by the Malay natives of the island "Bohun Upas," of which he had heard and read such marvellous things, *as shook his faith, till a strict inquiry convinced him of the error of his incredulity.* It was after his return from these travels that he drew up his account of the tree, which he introduces with this assurance: "I will relate only simple and unadorned facts of which I have been an eye-witness,—the reader, therefore, may depend on the accuracy of my account."

According to this account the dreadful poison-tree was situated at the distance of twenty-seven leagues from Batavia, and only fourteen leagues from Soura-Charta, the place of the emperor's residence. It grew in a deep valley entirely surrounded by barren mountains. Being determined to go as near to the fatal spot as safety permitted, and having obtained the emperor's sanction for so doing, Foersch set off and travelled entirely round the mountains that enclosed the Upas valley, *keeping always at the distance of eighteen miles from its centre,* —an operation which we can account for, only by supposing him endowed with mathematical instinct, for he did not know where the centre of the valley was!

At court, a Malay priest had furnished him with a letter of introduction to another Malay priest, considerately placed by the emperor to prepare the souls of the criminals who were sent to gather the poison of the tree. This shriving priest, he says, lived at a place fifteen or sixteen miles from the tree, and was very kind and communicative. He informed Foersch that he had held his sad office for thirty years, during which time he had despatched seven hundred individuals to the Upas, of whom not two in twenty had returned. The veracious surgeon had, of course, learned before that only criminals who had incurred capital punishment were sent on this most perilous errand.

When the victims of justice, the story continues, have chosen this lot, they are generally instructed how to proceed with the greater chance of safety, and individually presented with a silver or tortoiseshell box, in which they are to deposit the poison. They then put on their best clothes, and journey, accompanied by their friends and relatives, as far as the residence of the priest: there that holy man furnishes each of them with a pair of leather gloves, and a long leather cap which descends as far as the breast, having two eye-holes with glasses to permit the wearer to see. When thus accoutred, the priest repeats the instructions for the journey, and after taking leave of their weeping friends, the criminals ascend a particular mountain pointed out to them—then descend on the other side, where they meet a rivulet, whose course they are to follow, as it will guide them to the tree.

Foersch asserts that he was present at one of these melancholy departures from the old priest's house, and had such close communication with the victims, that he gave them some silken cords wherewith to measure the tree, and earnestly requested them to bring him back some piece of the wood, or a small branch, or a few leaves of the Upas. He obtained, however, only two dry leaves, with the scanty information that the tree was one of middling size, with five or six young ones of the same kind growing close by it. A continual exhalation (according to the few who returned) issued from the tree, and was seen to rise and spread in the air "like the putrid steam of a marshy cavern." Whatever this vapour, or the miasmata from it, touched, it killed; and as they had cursed that spot for centuries, not a tree, save the Upas and its progeny—not a bush, nor a blade of grass was found in the valley, nor on the surrounding mountains, for a circuit of many miles. All animal life was equally extinct—there was not a bird of the air to be seen—not a rat, nor a mouse, nor any even of those reptiles that swarm in foul places. In the neighbourhood of the tree the barren ground was covered with dead bodies and skeletons—the remains of preceding criminals. This was the only circumstance that shewed animate beings had ever been there; and as the birds and beasts of prey and the consuming worms could not batten in that valley of death, those ghastly relics would long remain unconsumed to warn every new comer of his all but inevitable fate.

After many minor details of the wonderful effects of the tree upon the spot where it grows, Foersch proceeds to inform his readers that the poison used artificially by the people of Java is the gum of the Upas mixed up with citron-water, &c., and goes on to describe its lightning-like rapidity of effect in this form. He says he was present at the execution of thirteen women of the palace, convicted of infidelity to the emperor's bed—that these victims, being slightly wounded by a kritz, or Malayan dagger, whose point had been dipped in the poison, instantaneously suffered the greatest agonies, and were all dead within sixteen minutes. He is positive as to the number of minutes, for, says he, "I held my watch in my hand all the time." He adds, that a fortnight after he saw seven Malayans executed in the same way.

The statements of this person were at length met with positive contradictions by a Dutchman named Lambert Nolst, a translation of whose memoir was published in the 64th volume of the "Gentleman's Magazine," in 1794. This gentleman, a physician and member of the Batavian Experimental Society at Rotterdam, on the authority of one John Matthew, who had resided twenty-three years in the island of Java, and had been there at the time when Foersch pretended to have made his wonderful observations, most indisputably proved Foersch's story of the Upas tree to be a bare-faced forgery.

Not long after Foersch's fabrication, a Swedish naturalist, whose name has been latinized into Aejmelæus, in an inaugural discourse read at the University of Upsal, gave an account of the Bohun Upas, or poison-tree of Macassar. He says this tree grows in many of the warmer parts of India, as Java, Sumatra, Bali, Macassar, and Celebes. That there are two species of it, male and female. That its trunk is thick, its branches are spreading, its bark dark brown; its wood solid, pale yellow, variegated with black spots, and its fructification as yet unknown. The wild fancies of Foersch find no place in this discourse, but the tree whose poison had been found so dangerous, was still an object of wonder and awe; and as the honest naturalist did not pretend like his predecessor to speak in all things as an eye-witness, a little lingering exaggeration may be excused in him.

At length, during the English occupation of Batavia, we obtained a correct description of the poison-tree of Java, which, in all likelihood, is the same as that found growing in Macassar and other places in the Indian seas. This description was furnished by Dr. Horsfield, and will be found with all its scientific detail in vol. viii. of "Batavian Transactions," or, as quoted in a note, in Sir Stamford Raffles' splendid work on Java. We merely abridge the Doctor's account, begging our readers to remember the particulars hitherto mentioned. Our author says, that though Foersch committed an extravagant forgery, yet the existence of a tree in Java, from the sap of which a fatal poison is prepared, is a fact. This tree is the "Anchar," which grows in greatest abundance at the eastern extremity of the island. It belongs to the twenty-first class of Linnæus, or the Monœcia. The male and female flowers are produced on the same branch at no great distance from each other;

the females being in general above the males. The seed-vessel is an oblong drupe, covered with the calyx; the seed, an ovate nut with cell. The top of the stem sends off a few stout branches, which spreading nearly horizontally with several irregular curves, divide into smaller branches, and form an hemispherical, not very regular crown. The stem is cylindrical, perpendicular, and rises completely naked to the height of sixty, or seventy, or even eighty feet; near the surface of the ground it spreads obliquely like many of our large forest trees. The bark is whitish, slightly bursting into longitudinal furrows. Near the ground this bark is, in old trees, more than half an inch thick, and when wounded, yields copiously the milky juice from which the poison is prepared. This juice or sap, is yellowish, rather frothy; and when exposed to air its surface becomes brown. In consistence it is much like milk, but thicker and more viscid.

The sap is contained in the true bark, or *cortex*. The inner bark (*liber*) is a close, fibrous texture like that of the paper mulberry-tree called *morus papyfera;* and when separated from the other bark and cleansed, resembles coarse linen. It has been worked into strong ropes; and that from young trees is often converted by poor people into a coarse stuff which they wear while working in the fields. If wetted by rain, however, this flimsy covering affects the wearer with an intolerable itching. Although this curious property of the prepared inner bark is known wherever the tree grows, yet the preparation of poison from its sap is a secret exclusively possessed by the inhabitants of the eastern extremity of Java.

In making his numerous experiments on the tree, Dr. Horsfield had some difficulty with his native labourers, who feared a cutaneous eruption, but nothing more. Now, we may mention here, that this eruption, and other symptoms, are produced by the well-known Chinese varnish-tree, whose sap, like that of this poison-tree, is procured by making incisions in the trunk.

The anchar is one of the largest trees in Java; it delights in a fertile, not very elevated, soil, and is found only in the midst of the largest forests! "It is," says Dr. Horsfield, "on all sides surrounded by shrubs and plants, and in no instance with barren desert." The largest specimen he saw was so embosomed in common trees and shrubs that he could hardly approach it; wild vines and other climbing shrubs, in complete health, adhered to it, and ascended half the height of its stem. While he was collecting its sap he observed several young trees that had sprung up spontaneously from seeds dropped by the parent plant.

Dr. Horsfield also describes the preparation of the poison, as the process was performed for him by an old Javan, who was famed for his skill in the art. The poison thus made seems to affect quadrupeds with nearly equal force, proportionate in some degree to their size and disposition. It is fatal to dogs in an hour, to mice in ten minutes, to monkeys in seven, to cats in fifteen minutes, while a poor buffalo subjected to the experiment was two hours and ten minutes in dying.

Rumphius, the naturalist, saw the effects of the poison on human beings, when, in 1650, the Dutch in Amboyna were attacked by the Macassars, who used arrows dipped in this or some very similar preparation. "The poison," says he, "touching the warm blood, is instantly carried through the whole body, so that it may be felt in all the veins, and causes an excessive burning, particularly in the head, which is followed by sickness and death*." After it had thus proved fatal to many Dutch soldiers, who trembled at its name, and no doubt were the first to exaggerate the horrors of the tree that produced it, they discovered an almost infallible remedy in a root—the radix toxicaria of Rumphius—which, if timely applied, counteracted by its violent emetic effect the force of the poison.

* Herbarium Amboinense.

THE DEAF TRAVELLER.—No. 2.

Caravans:—Departure from Bagdad.

I mentioned in my last paper that I had resided in Malta. On my return from thence in 1829, I went to Bagdad, by way of Petersburgh, Moscow, Astrakhan, Teflis, the capital of Georgia, Tabreez in Persia, and Sulimaneh, in Lower Kourdistan. Bagdad, at which, after six months' travel, we arrived, is perhaps of more interest to the general reader than most other Eastern cities, from its connexion with the Arabian tales, which most people have read at some time of their lives. I resided in that town through a most interesting period of its history; and, during my stay, made many observations, which, however, it is not my present business to communicate. Before I left, I had also an opportunity of making an excursion down the river Tigris and back again, the details of which we must at present pass over. My journey back to England was by way of Kermanshah, Hamadan, Tehraun, the metropolis of Persia, Tabreez, Erzeroum, and Trebizond, on the shores of the Black Sea. At all these places we made considerable pauses, particularly at the last, from which we went over the Black Sea to Constantinople, and after remaining there upwards of five weeks, proceeded to England by water. Some details of this last journey, which occupied more than nine months, it is my present object to supply.

Having made up our minds to leave Bagdad, we had notice, only a day and half before it started, of a caravan with which we might travel. During this short period we were distracted by continually conflicting reports as to the time of departure. In fact, the clock-work regularity of travelling movements in England is quite unknown in Western Asia; nor, on account of the badness of the roads and numerous circumstances of interruption, would an approximation to such regularity be easily practicable, even were the men more exact in their appointments and arrangements than they are.

By a *caravan*, we understand in England a kind of waggon, in which wild beasts are conveyed from fair to fair for exhibition. But in the East, a caravan is a large body of camels, horses, or mules, bearing merchandise from one place to another. For an opportunity of going with a caravan, travellers, whose business is not very urgent, have often to wait several months. I have known some wait for upwards of a year. But those who are in much haste, and can bear such a mode of travelling, may go with those public messengers, called *Tartars*, who make all possible expedition. But even opportunities of thus travelling are very uncertain, as are all things in the East relating to comfort and convenience.

On account of the desert marauders, and the usually unsettled state of these countries, the opportunity of travelling with a caravan is generally eligible in the proportion of its size. It frequently consists of several hundred animals, with an uncertain and various company of muleteers, merchants, travellers, and, it may be, pilgrims; all, or most of them, fiercely armed with guns slung at their backs, sabres by their sides, and their girdles bristling with long daggers and pistols. All these warlike instruments will often be carried by one man, filling an European with infinite compassion for the burdensome infliction beneath which he swelters in the broiling sun. But a man generally assumes importance in proportion to the number of weapons he carries; and a very useful object is answered if an attack on the caravan is prevented by the warlike appearance of its members.

The motley assemblage that usually accompanies a caravan is variously mounted. The muleteers and poorer pilgrims commonly walk, as indeed the former generally must in order to whip on the cattle, and be ready to rectify any misadventures or disturbance of the balance in their burdens. But sometimes there are a few spare asses in the caravan, on which they treat themselves with a ride when weary. The asses, however, greatly preferring to browse along as independent members of the party, are often very hard to be caught when their services are required.

Some travellers, who join caravans, ride their own beasts; but this is not at all the most expedient course; and most people hire the beasts belonging to the muleteers. In this case the traveller has no trouble about them. Moslems are certain to obtain the best horses the caravan can afford; the native Christians, if there be any of the party, are next considered; and Franks, if they have no servants to bluster for them and drub the muleteers, must be content with the refuse of the two former denominations. But in ordinary circumstances it little signifies with what powers, besides that of supporting fatigue, one's beast is endued, the pace of a caravan seldom averaging more, if so much as three miles an hour. It is of importance only in reference to the fear of attack and the prospects of escape; and these are always matters of consideration. The mounted travellers may be divided into *three* classes: those who ride saddle-horses, with servants in attendance; those who having but little baggage choose to ride upon it; and those who join the party on their own donkeys, which they sometimes relieve by walking, though many ride the little creatures continually through stages of thirty or more miles, for many successive days. It may be added, that in proceeding towards Bagdad through Persia one can seldom join a caravan, or in going from the same place, meet one, in which are not a considerable number of dead bodies in the course of being taken to the holy places near Kerbela on the Euphrates, for interment.

The contradictory reports which we heard of the time when the caravan was to start, placed us in the unpleasant situation of holding ourselves in readiness to depart at a moment's notice, without being certain that we should go for several days. At last, after I had the preceding night gone to rest in the persuasion that our stay would be considerably prolonged, I was awakened very early on the morning of September 18th, 1832, by the information that the muleteers were come with our horses. These were two, one for each traveller and his baggage. Thus summoned to depart, we took a hasty breakfast while the men disposed our baggage on the horses. My beast bore my saddle-bags thrown over a high pack-saddle. One bag contained a small portmanteau, and the other a carpet-bag, and another of biscuits and dates. Over this was spread one of those thick quilts which are used in the East both for beds and bed-covers, a blanket; and a pillow, forming altogether a saddle for me by day, and a bed by night. These articles, with a leathern water-bottle dangling at the left saddle-bag, to which it was attached by a hook, formed the sum of the effects I intended for use during the long and arduous journey before us. And *all* was not so intended, for my portmanteau was filled chiefly with papers, which I supposed I might need sooner after my arrival in England than I should be able to receive them by way of Bombay. We then equipped ourselves in our oriental dresses. This, in my case, consisted of a Persian black cap (*kullah*) of Khorassan lambskin, a Turkish gown (*zaboon*), an Arabian black cloak (*abba*), and the necessary appendage of mustaches. Thus attired, we threw our legs widely astraddle over the heap of bed and baggage, and bade farewell to the city of the Caliphs.

AN ENTERTAINMENT IN BORNEO.

All at once we were ushered into a splendid room, seventy or eighty feet square, brilliantly lighted and not ill-furnished, but strongly contrasted with the darkness and dirtiness of the suite we had passed through. * * * *

In the centre of this gorgeous room, on a part of the floor raised to about a foot and a half above the level of the rest, and laid with a rich Turkey carpet, stood a long table, at the top of which the sultan placed the admiral, and then made the signal for tea. First entered an attendant, bearing a large tray, on which were ranged several dozens of exceedingly small cups. These he placed on the carpet, and then squatted himself down, cross-legged, beside it. Another attendant soon followed bearing the tea-pot, and he likewise popped himself down. After a conjuration of some minutes the cups were brought round, containing weak black tea, exquisite in flavour, but marvellously small in quantity. There appeared no milk, but plenty of sugar-candy. Some sweet sherbet was next handed round, very slightly acid, but so deliciously cool, that we appealed frequently to the vase or huge jar from which it was poured, to the great delight of the sultan, who assured us that this was the genuine sherbet described by the Persian poets. It was mixed, he told us, by a true believer, who had made more than one pilgrimage to Mecca. * * * *

The sultan appeared to enter into his guest's character at once, and neither overloaded him with attentions, nor failed to treat him as a person to whom much respect was due. I heard Sir Samuel (Hood) say afterwards, that he was particularly struck with the sultan's good-breeding, in not offering to assist him in cutting his meat. The sultan merely remarked that few people were so expert as his guest even with both hands; adding, neatly enough, that on this account the distinction which his wound had gained for him was more cheaply purchased than people supposed. While the admiral was hunting for some reply to this novel compliment, his host remarked, that in Borneo it was considered fashionable to eat with the left hand.

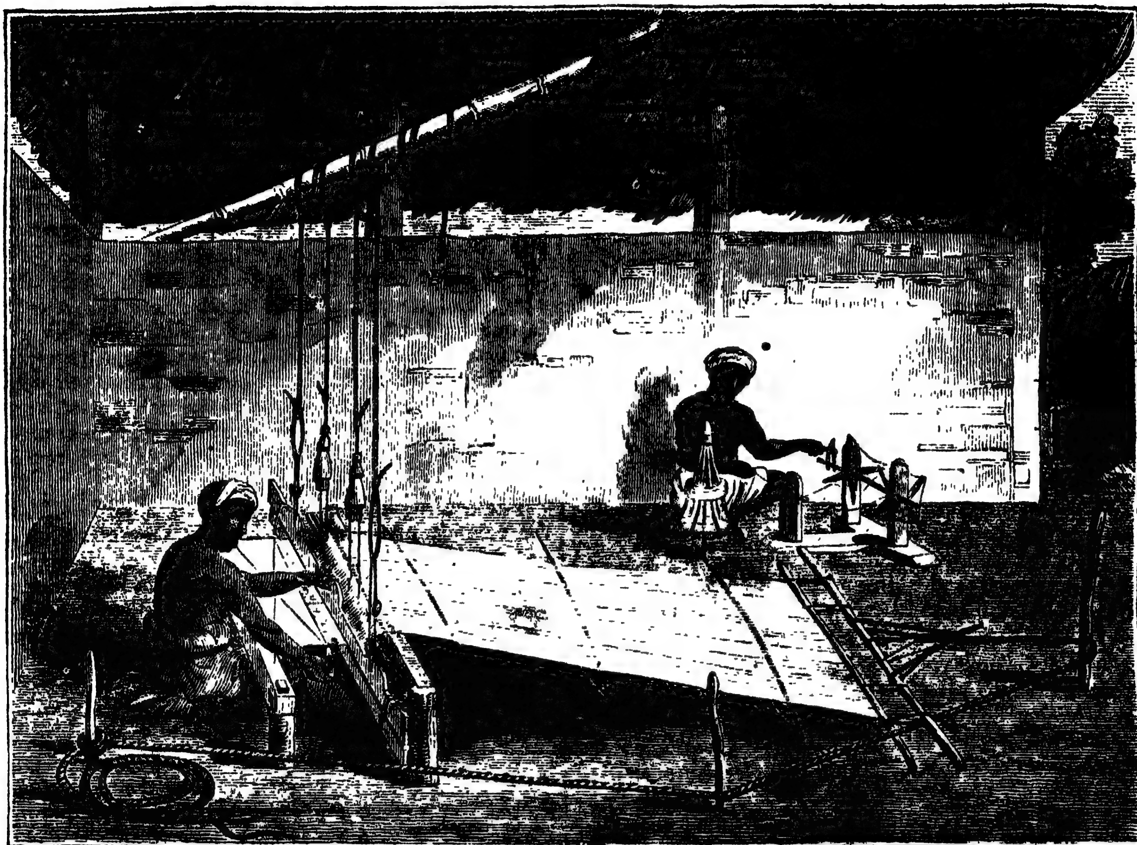
The supper, which soon followed the tea, consisted of about a dozen dishes of curry, all different from one another, and a whole poultry yard of grilled and boiled chickens, many different sorts of salt fish, with great basins of rice at intervals, jars of pickles, piles of sliced pine-apple, sweetmeats, and cakes. Four male attendants stood by with goblets of cool sherbet, from which, ever and anon, they replenished our glasses; besides whom, a number of young Malay girls waited at a distance from the table, and ran about nimbly with the plates and dishes.

All the persons who approached the sultan fell on their knees, and having joined their hands in the act of supplication, lowered their foreheads till they actually touched the ground. The sultan held out his hand, which the people eagerly embraced in theirs, and pressed to their lips. What they had to say was then spoken, and after again bending their foreheads to the ground, they retired. This ceremonial took place only in the outer room or hall of audience, for no one, except the strangers and one or two of the principal officers of state, was permitted, to approach nearer than twenty or thirty feet of the raised part of the floor where we sat. At that distance, a group of about twenty persons, probably the nobles of the court, sat cross-legged on the ground in a semicircle facing the sultan, and in profound silence during the whole supper, no part of which appeared to fall to their share.

Soon afterwards the cloth was removed, and a beautiful scarlet covering, of the texture of a shawl, substituted in its place. This might, perhaps, give us a hint for after dinner. Instead of dull mahogany or dazzling white, why might we not spread over the table a cloth couleur de rose for the benefit of the complexions of the company?—*Fragments of Voyages and Travels, by Captain Basil Hall.* Third Series, vol. iii.

Men of Business.—Some decide sagaciously enough on what ought ultimately to be done, but blunder most egregiously as to the means and method of accomplishing the object they have in view; others have not sufficient powers of mind to foresee the result of any measure, yet will immediately hit upon the means of carrying it into effect, good or bad. The last generally ruin themselves by a superfluous activity; the first dream and stagnate. The possession of both qualities constitutes the complete man of business.—*Notes on Various Sciences.*

WEAVING IN CEYLON.



[Process of Weaving by the Cingalese.]

One of the most curious subjects for reflection is supplied by a comparison of the arts of nations of high antiquity, and of those whose civilization is of a more recent date. The various manufactures, for instance, of the Chinese and Hindoos are, as far as they demand manual skill and patience, equal, if not superior, to those of Europeans. But then, on the other hand, they appear incapable of improvement;—and not being assisted by machinery they are conducted with an expenditure of labour, that, if attempted amongst ourselves in the same way, would either compel the labourers to comparative starvation, or put the commonest article manufactured beyond the reach of any but the richer consumers. A yard of cotton cloth may now be bought in England for sixpence; but what would it cost if it were to be produced in the manner of the weavers of the East? The following narrative, describing weaving as now carried on in Ceylon, has been communicated to us by a gentleman who resided there:—

"On the 5th of January, 1821, two Kandyan weavers came to the general hospital with all their implements for weaving, for Mr. Marshall's and my inspection. I showed them into a kind of open shed, with which they seemed pleased, and here they established their manufactory. They commenced their operations by driving four rude posts into the ground, left them about thirteen inches high; the one, as it turned out afterwards, for the support of the breast-beam, which was square; and the other supported a flat board for the purpose of raising the web a little behind the headles. The breast-beam had a groove cut into it for the purpose of fixing the end of the web in, but by filling it with water, it answered as a level. Their mode of levelling the two beams with each other, was by placing a slip of the rind of a plantain tree upon them, and, pouring water upon the centre, any inclination was ascertained with great accuracy. Between the four posts a hole was now dug, a little more than knee deep, in which the weaver was to put his feet when working, sitting upon the edge of the hole.

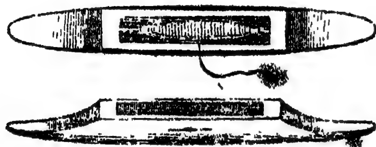
"Nothing could be more rude or simple than the different articles used: and some idea may be formed of them, when I state, that the loom, including everything employed in weaving, is purchased for something less than half-a-crown. The warp had been previously put into the headles and reed. No beam for the warp is used, but the whole reached within a few inches of the ground at once. From the extremity of the web a cord is extended round several stakes driven into the ground, and at last is fixed by a sailor's knot (the clove hitch) to a post close to the weaver, who, by slacking off a little as occasion requires, by degrees draws the unwoven part of the web towards himself,—several rods (lease wands) are run through the warp for the purpose of steadying the threads and preserving the shade or lease, and are drawn out as the web advances. The headles had only two leaves instead of treadles; two cords descended into the hole with a piece of lead attached to each; and this was taken between the two first toes, and so worked. The lay is suspended by two coarse cords. It consists of two pieces of board with a groove in each for the reception of the reed, which is retained by a cord at each end. The shuttle resembles that used in Britain in weaving woollen. At seven o'clock, A.M., the loom was tied up, and at nine, A.M., he was weaving with great rapidity. The warp was very coarse but regular, and had been dressed before he came. Rice boiled in water is the substance used for this purpose, and it is applied to the yarn by means of a bit of rag. I detained the operator for several hours in taking sketches, yet he finished his work by 2 P.M. It might be three yards long, and the weaving cost nearly sixpence. The weaver seemed to possess a large share of vanity, and was much pleased to show that he could weave with his eyes shut. The weavers are of a very

low cast. On going in he used to fall flat, and there keep knocking his head upon the ground.

"Another important personage remains to be mentioned: his duties were that of pirn-winder and assistant. He was a much younger man than the principal. His implements were, if possible, more rude than those already mentioned. The woof was brought in a leaf, and was wringing wet with thick congi-water (fluid paste). It was done in hanks or skeins of about eight inches in diameter. The machine, corresponding with the swifts, was formed by splitting a bamboo into six portions within three inches of one end; these splits were kept asunder, at the lower end, by means of a hoop. The bamboo was twenty inches in length. A thin rod was driven into the ground, and the bamboo rested upon and revolved round it.

"The winder kept five or six pirns only a-head of the weaver, but whenever a thread of the web broke it was his duty to get up and tie it; and, indeed, he had to do everything out of the reach of the weaver, who could not get out of his hole, without unshipping the breast bone. Thus they went on very sociably together, always working, chewing betel, and conversing.

"I understand their manner of warping is performed by fixing sticks in the ground at certain distances, and leading the yard round them, which had been put upon the split bamboo, as in filling the pirns and centre stick held in the hand. The yarn is spun by women with the distaff."



[Shuttle used by the Cingalese.]

DOMESTIC SERVANTS.

Domestic servants, especially females, form so large a class of society, and the welfare of the community is so mixed up with their own good conduct, as well as with the just behaviour of their employers, that we may occasionally offer a few observations that appear to us desirable to be borne in mind by each party to the contract. We will first address ourselves to maid-servants and their employers.

Let a young female when she first enters into service strive as much as possible to conform to her situation in life, instead of seeking with restless eagerness to raise herself above it. By the practice of undeviating rectitude, let her convince her employers that she is worthy of confidence. Let her keep a strict watch over her own temper, and not be too impatient of present inconvenience, or anxious to change her employer, lest she should only thus, in avoiding a lesser, have to endure a greater ill. Let her occupy herself diligently in her allotted labours, instead of seeking pleasures adverse to their fulfilment. Let her be anxious to do her duty strictly, though not servilely, cheerfully submitting to minor annoyances, and bearing with the temper and even caprices of her employer, not with sycophancy but with patience.

That a servant so disposed will find many who will properly estimate her worth there can be no doubt; but the number of those employers who indulge unreasonable expectations is, we fear, considerable, and we may therefore not improperly add a few words upon the right way of attaching good and faithful domestics.

In the formation of every contract the practice of the higher virtues of honesty and truth are essential between the contracting parties. But there is another class of virtues scarcely less important in all our social relations of life, and which is sometimes supposed to be beneath the observance of those who are most conspicuous for the possession of qualities which ennoble and do honour to the human race. These great attributes, however, can only be exerted on great occasions; while the constant exercise of the softer virtues sheds a charm over the business of every-day life, and constitutes the happiness of our intercourse with each other.

In no relative situations is this disposition more required than between the employed and the employer, and yet in no situations, perhaps, are they in general so little understood and practised. *Consideration for the feelings and comforts of others*, which includes forbearance, good temper, and all the amiable characteristics of our nature, should actuate us as much in this as in any other relation of life. It is too frequently supposed that the acts of regularly paying domestics their wages, and of supplying them with a sufficiency of food, are the only duties incurred in return for the services conferred upon the employers. Much more, however, is requisite from one social being to another.

The contract entered into is for a mutual benefit, and the comfort of each party depends very much on the manner of its fulfilment. It is the duty of an employer to minister to the happiness of those who serve him, and who could do much better without his assistance than he without theirs. By his example, as well as by his exertions, he should keep them in the path of right as far as in him lies; watch over their conduct; and above all things beware not to require of them any service inimical to the strictest rules of morality. The employer should desire to obtain the maximum of happiness rather than of labour for his money, while at the same time he should not permit the employed to use any improper means by which to spare their labour, and thus obtain undue profits for their exertions. Domestic servants should, if possible, be so treated as to be made to feel themselves part of the family.

A culpable carelessness to the transgressions of the employed class, as *members of society*, is usually combined with undue severity for their faults as *servants*. Now the reverse of this should be the case: while inflexible as to their general good conduct, omissions in their household duties should be looked upon with a more lenient eye;—allowances should be made for deficiencies which, if the situations were reversed, might perhaps be still greater.

We should strike the balance, and if the more intrinsic merit remain—if those duties most required are well performed—employers would do wisely, for their own comfort as well as for that of the employed, not to exact a too rigid execution of every service which they think proper to define as forming the business of their domestics.

THE BATTLE OF CRESSY.

The battle of Cressy was fought on Saturday the 26th of August, 1346. The English king, Edward III., in prosecution of his unfounded claim to the crown of France, had set out from the port of Southampton for the invasion of that country with a fleet of a thousand sail, in which he had embarked an army of thirty thousand men. He was accompanied by the flower of his nobility, and likewise by his eldest son Edward Prince of Wales, afterwards famous under the name of the Black Prince. The prince had just then completed his sixteenth year.

The invading force was disembarked in safety at La Hogue, in Normandy, on the 12th of July. The fury of the soldiery was first let loose upon the town of Caen, where the barbarities of a licentious army were provoked by the feeble opposition of the inhabitants. Edward then proceeded along the south bank of the Seine, not being able to get across that river, as he wished to

do, in consequence of all the bridges being broken down. But every village and corn-field that he encountered in his progress he laid waste with pitiless ferocity. Meanwhile, however, the forces of the French king were advancing from all quarters to the scene of these outrageous proceedings. Unless he could make his escape to the north, Edward saw that his destruction was certain. In these perilous circumstances he had recourse to stratagem. Having come to the bridge of Poissy near Paris, which like the rest had been rendered useless, he suddenly ordered his army to march forward, when he was, as usual, after a short delay, followed in the same direction by a party of the enemy which occupied the opposite bank. He then returned by a rapid march to Poissy, and got over his army without interruption. He had still, however, another river, the Somme, to cross, before he could reach Flanders; and the enemy, amounting to a hundred thousand men, and commanded by the king, Philip VI., in person, was so near upon him, that if he could not accomplish his passage within a few hours, he ran the risk of being driven before them into the river. He resolved therefore to make the attempt at all hazards. A peasant having been induced by the offer of a reward to discover a place at which the river might be forded at low water, Edward, taking his sword in his hand, plunged in: his army followed their gallant leader; and although they were met when they reached the opposite shore by Godemar de Faye, at the head of a body of twelve thousand men, they quickly made good their landing, drove back the enemy, and pursued them for some distance over the adjacent plain. The bold achievement had been effected just in time. While the rear of Edward's army was yet in the water, the vanguard of that led by Philip reached the bank they had left. Deterred, however, by the rising tide, the French king declined pursuing his enemy across the ford.

Still Edward had not escaped the necessity of fighting the immensely superior force which was thus bearing down upon him. Accordingly, having spent the night in surrounding his position with trenches, he, the next morning, drew up his army in three divisions on a gentle ascent near the village of Cressy, opposite to which he had crossed the river. The command of the foremost division he committed to his son, the Prince of Wales, giving him for his counsellors, in this his first essay of arms, the Earl of Warwick and Lord John Chandos. The second division was given in charge to the Earls of Arundel and Northampton; and Edward himself, at the head of the third, which consisted of twelve thousand men, took his station on an adjacent hill, from a windmill on the summit of which he viewed the fight. The carriages and horses were placed in a wood behind the troops

Part of the morning had been spent by Edward in riding along the ranks of his army, and addressing to them such exhortations as were most proper to call up in the breast of every man the courage and firmness which the occasion demanded. The whole body then, after taking a slight repast, laid themselves down on the grass, and awaited the enemy's approach. This was about nine o'clock.

It was three in the afternoon before the more unwieldy mass, led by the French king, had all advanced and been arranged in order to engage. The attack was commenced by a body of fifteen thousand Genoese crossbow-men. But a shower which fell a few moments before having wetted the strings of their bows, their volley fell short of its aim, and produced no effect. The English archers, whose weapons had been protected from the rain, immediately poured in upon them in return a shower of arrows, which told so well as to throw the whole body of the Italians into confusion. Struck with sudden panic, they wheeled round, and rushed back among the ranks behind them. This first blow decided the fortune of the day. The remainder of the affair was a rout rather than a battle. The Genoese were trodden under foot and cut to pieces, principally by the French themselves, who were beset and pressed upon as much by these, their allies, as they were by their English enemies. At length, however, one of the divisions of King Philip's army, commanded by the gallant Earl of Alençon, having got clear of this tumult, attacked the Prince of Wales with great fury. This assault was repelled, but was immediately followed by another directed against the same point by three fresh squadrons of French and Germans. On this the Earl of Warwick dispatched a messenger to King Edward, begging him to come up with the reserve to the assistance of his son. "Is the prince dead or wounded, or felled to the ground?" inquired Edward; and being told that he was still alive, "No," said he, "the glory of this day shall be his own as he deserves it should; while he lives I shall not interfere." Edward judged aright how the battle was going. In a few minutes the enemy were again driven back. The prince now in turn advanced with his men. It was in vain that the French king rushed to meet them in person at the head of a column of his best troops. The torrent of English archers and men-at-arms bore down all before them; and that day no further resistance was attempted by the scattered and flying host.

When the night came, and the field had thus been cleared, Edward wisely forbade his soldiers to continue the pursuit. The father and the son now met and embraced each other, their hearts exulting with joy and thankfulness. "God give you grace, my dear son," said Edward, "to persevere in the course you have begun;—you have acquitted yourself nobly, and deserve the imperial crown for which we have fought!" The more considerate youth only bowed almost to the ground, and said nothing. With all his fire and daring in battle, he had none of the arrogance and presumption of his father's temper; and, throughout his life, never showed himself inclined to take merit to himself, or to trample on either the rights or the feelings of others.

Early in the next morning many thousands more of the enemy were slain by a body of horsemen, whom Edward sent forth to scour the surrounding country. It is said that altogether thirty thousand French fell in this memorable carnage, among whom were the two kings of Bohemia and Majorca, the Duke of Lorraine, the nephew of the French king, three other sovereign princes, many of the chief nobility of France, twenty-four baronets, twelve hundred knights, fifteen hundred gentlemen, and four thousand esquires. Philip himself, after having been twice wounded, and having had his horse killed under him, with difficulty made his escape. The English lost only three knights and one esquire, with a very inconsiderable number of common soldiers. "It is evident," says Arthur Collins, in his Life of the Black Prince, "from the history of the baronage of England, that not one of the English nobility fell that day, though most of them accompanied their King to the battle, as appears from the same authority." We may add that, according to one author, the English at the battle of Cressy made use of cannons, which were first employed on that occasion; but this circumstance is not mentioned by those contemporary writers who have given the most minute accounts of the action, and, for various reasons, seems rather improbable.

This great fight was followed by some immediate, but by no permanent results. Neither the triumphs of Cressy and Poictiers, nor that of Agincourt, many years after, sufficed to establish the English dominion in France. Fortunately both for France and England, the equally wonderful successes of the Maid of Orleans swept away, in a few months, all that had been effected in promotion

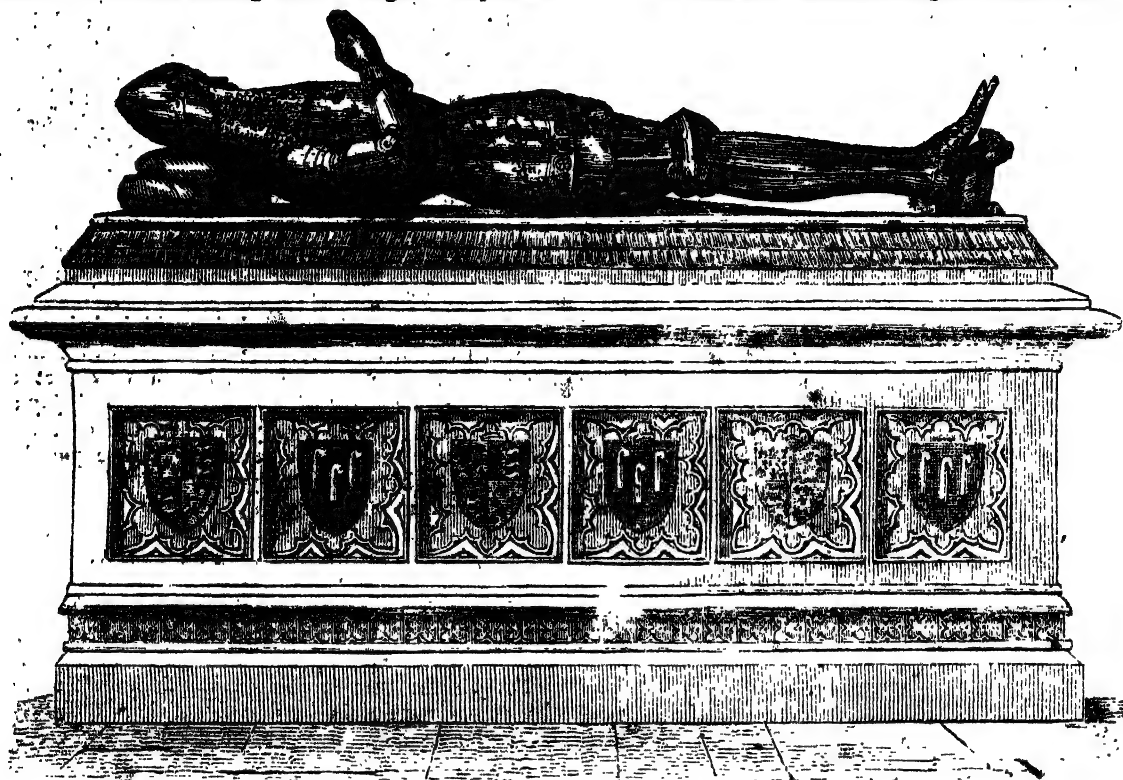
of this insane and unjustifiable project by the victories of a century.

Edward the Black Prince died, in 1376, at the age of forty-six years. He was buried in Canterbury Cathedral; and his monument, of which the following woodcut is a representation, is still very perfect.

"Over the tomb is a wooden canopy, carved and painted. On the underside of which is painted a representation of God the Father sustaining before him the Son on the Cross; at the angles are the symbols of the four Evangelists. The heads of the two principal personages have been effaced.

"The military accoutrements of the Black Prince, which are suspended by an iron rod above the tomb, are exceedingly curious: they are, perhaps, the most ancient remains of the kind existing, and, as might be expected, convey information on points, which, but for such evidence, can be gained but by inference. The shield, fastened to the column at the head of the tomb, is of wood, entirely covered with leather, wrought in such a manner, that the fleurs-de-lis and lions stand forth with a boldness of relief and finish, that when we consider the material employed, is truly wonderful; at the same time possessing, even to this day, a nature so firm and tough that it must have been an excellent substitute for metal. This is beyond doubt the celebrated 'Cuirboulli' so often spoken of by writers of the time: the surcoat, till closely examined, gives but little idea of its original splendour, as the whole is now in colour a dusky brown; it has short sleeves, and is made to lace up the centre of the back *."

* C. A. Stothard's Monumental Effigies of Great Britain.



[Monument of Edward the Black Prince in Canterbury Cathedral.]

How to make Coffee.—Having given, in the Sixth Number of the Penny Magazine, some account of the method of preparing coffee for sale, we think it right to subjoin the best way of preparing it for actual consumption. We shall first quote the directions of that excellent practical philosopher, the late Dr. Kitchiner, and then mention a few points in which we venture, with due diffidence, to dissent from that great authority. "Coffee, as used on the Continent, serves the double purpose of an agreeable tonic, and an exhilarating beverage, without the unpleasant effects of wine. Coffee, as drank in England, debilitates the stomach, and produces a slight nausea. In France and Italy it is made strong from the best coffee, and is poured out hot and transparent. In England it is usually made from bad coffee, served out tepid and muddy, and drowned in a deluge of water. To make coffee fit for use, you must employ the German filter,—pay at least four shillings the pound for it,—and take at least an ounce for two breakfast cups. No coffee will bear drinking with what is called milk in London. London people should either take their coffee pure, or put a couple of tea-spoonsful of cream to each cup. N.B.—The above is a contribution from an intelligent traveller, who has passed some years on the Continent." (*The Cook's Oracle*, fifth edition, pp. 391, 392.) The German filter (which we believe is now usually called a biggin) is certainly not necessary for making coffee; when made in a biggin it is lukewarm, nine times out of ten, from the time consumed in filtering. Our method is to boil it in a common pot, and by standing a few minutes, it becomes as clear as crystal. Not *very* near the fire, mind, lest the ebullition should continue. To add isinglass to refine it, is a superfluous refinement of luxury. From the reduction of duty, and other causes, the price of coffee has fallen most materially since our author wrote; the best colonial coffee is only two shillings and four pence per pound, and even the finest Mocha is only three shillings and sixpence. What is called milk in London is certainly very poor stuff, yet when boiled makes a passable addition to coffee—few like to drink it black. Those to whom the difference in expense is not an object of importance, will also find that the aroma of good coffee is best preserved by using lump sugar, as the flavour of brown sugar interferes with it. The brown, however, is used by thousands in this country, who are in tolerably easy circumstances. To attain absolute perfection, also, the coffee should be roasted (not burnt) the same day that the decoction is to be made from it. Coffee is undoubtedly a stimulus, though but a slight one, and should therefore be avoided by those of a very irritable temperament: to the majority of drinkers, however, it is as harmless as it was to Fontenelle, who, when told that coffee was a slow poison, remarked that it was a very slow one indeed; as he had taken it every day for more than eighty years.

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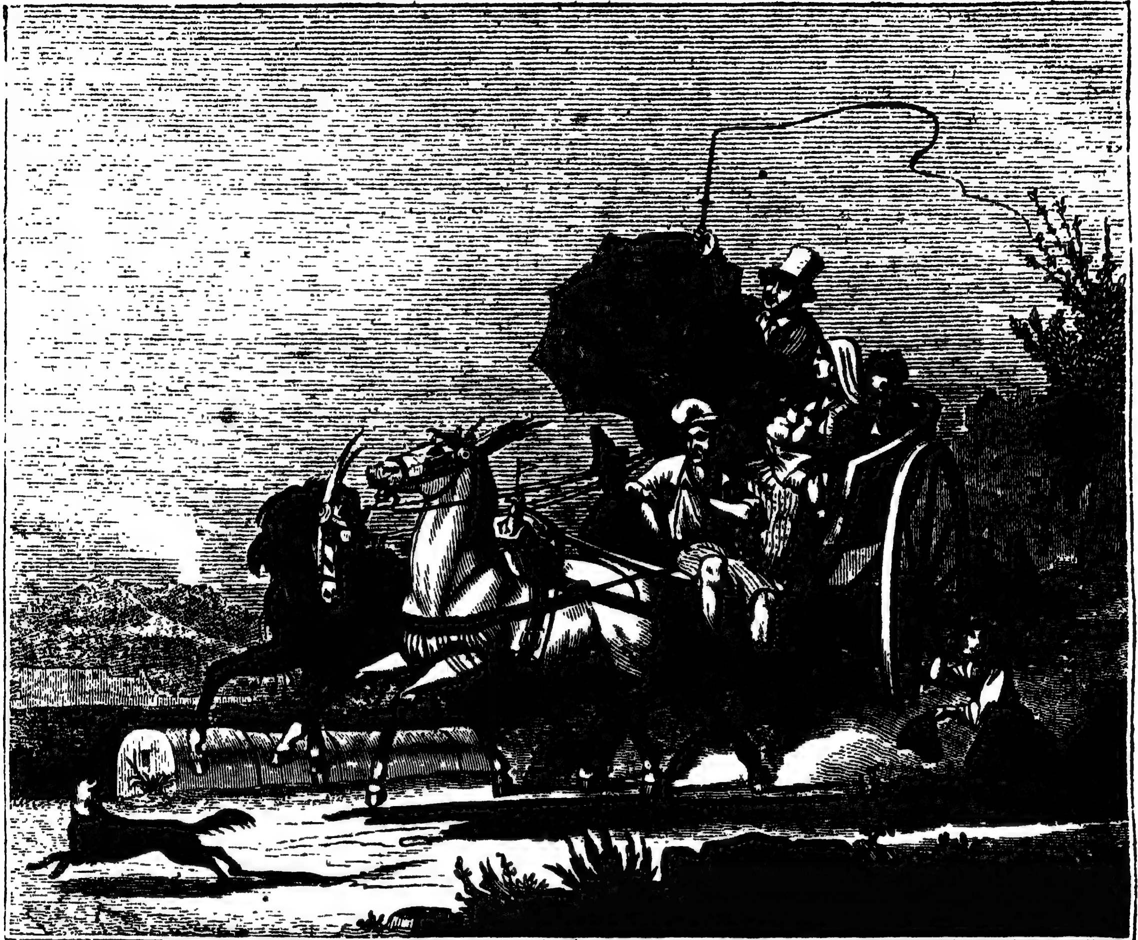
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THE CARRIAGES OF NAPLES.



[The Neapolitan Calesso.]

The boisterous, gay-hearted people of Naples are almost as much addicted to driving about in any sort of vehicle that can carry them as they are to eating maccaroni. The stranger, on his arrival at their city, cannot but be surprised at the immense number of carriages that dash through the town in all directions, nor fail to be puzzled in reconciling the extent of this luxury with the means of a ruined nobility, and a generally impoverished country.

The fact, however, is, that almost every Neapolitan, who pretends to anything like the rank of a gentleman, considers some sort of equipage as an indispensable appendage, to support which he will miserably pinch himself in other points of domestic economy. Added to this, there are no taxes on carriages and horses; the tradespeople and others, who will never walk when they can afford to pay for a ride, particularly on a holiday, (and besides the Sundays there is some holiday or saint's-day at least every fortnight, on an average,) contribute to the support of an amazing number of hackney coaches and cabriolets; and the very poorest of the people are as passionately fond of driving as their betters, and *do* contrive, by clubbing together, to indulge in that luxury on frequent occasions. It may thus be understood how Naples is more crowded with vehicles than any other of the European capitals.

These vehicles are in almost every possible fashion and state of preservation. The richer or more tasteful classes drive carriages which would not disgrace our parks, and are, generally speaking, superior to any display of the sort made at Paris. The Neapolitans, indeed, with the exception of the Milanese, surpass all the Italians in coach-building and taste in "a turn out;" and though you certainly see some of the worst, you also see some of the best equipages in Italy at Naples. But what produces an amusing effect is, that you constantly see the extremes of good and bad at the same instant. Most of the stylish, and all the more common part of this complicated machinery of communication, proceed along the streets at a violent pace; and as these streets are all paved with large pieces of lava not always well joined together, and as the inferior and infinitely more numerous portion of the equipages rattle fearfully as they go, the clamour produced might be thought almost the perfection of noise, were it not so frequently drowned by the shouts of the motley drivers, and the bawling of their fares, and of the foot passengers.

It would be doing an injustice to the Neapolitans not to mention that, though they set about it in a slovenly way, and generally use harness that would reduce our best "whips" to despair, they drive both fearlessly and

well, and are very rarely the cause of any accident even in the crowded, confused, narrow streets of the capital. In former times there used to be grand displays of driving at the end of carnival and beginning of Lent; and many of the great families had numerous and excellent studs, and bred horses of great spirit and beauty. Though these establishments for horses of pure blood are entirely broken up, the common breed of the kingdom is generally far from bad; while many parts of Calabria, and some districts of Apulia and Abruzzi, still furnish excellent animals. The Neapolitan horse is small, but very compact and strong; his neck is short and bull-shaped, and his head rather large; he is, in short, the prototype of the horse of the ancient *bassi-relievi* and other Roman sculptures found in the country. He can live on hard fare, and is capable of an immense deal of work;—he is frequently headstrong and vicious, but these defects are mainly attributable to harsh treatment, as, with proper, gentle usage, though always very spirited, he is generally found to be docile and good-natured. The Neapolitan cavalry, composed almost entirely of these small horses,—bred under the burning sun of the south of Italy,—withstood the rigours of the winter in the memorable Russian campaign better than almost all the others; and it is a curious fact, that during part of his retreat from Moscow, Napoleon owed his preservation to a body of three hundred Neapolitan horse, who were still mounted, and in a state to escort him.

Without paying attention to numerous minor varieties, the hack-vehicles of the Neapolitans may be divided into four great classes:—

1st. The *carozza d' affitto*, or *canestra*, or *carrettella*, which answers to our hackney-coach, but is generally a much more decent carriage, and not close, but open, with a head which can be raised or lowered. It is always drawn by two horses. The decent class of citizens are its greatest customers; but on holydays it is frequently found cram-full of washerwomen and porters.

2nd. The *corribolo*, which answers to our hack-cab, but is a much lighter and more elegant machine. A light body, capable of holding two passengers, is suspended on springs; one tough little horse runs in the shafts, and the driver sits on the shafts just before his fare. The body and wheels of the corribolo are always painted and varnished, as are also those of the canestra; the horse of the one, and the horses of the other are, moreover, generally put to with leathern harness. This little gig is invariably driven with great rapidity, and is a pleasant enough, but somewhat perilous conveyance. The corribolo is in great request with the men of the middling classes; and, on holydays, with both men and women of the poorer class. It is also a very great favourite with English midshipmen and sailors, who like to go fast. The number of this species of vehicle is truly extraordinary, as is also the manner in which they dart about; and it was to the corriboli that Alfieri more particularly referred (for the other kinds of chaises are not near so abundant) when, in describing Naples, he spoke of—

"All the gay gigs that flash like lightning there."

3rd. *The Flower-pot Calesso.*—This is truly a Neapolitan machine, which can' be compared to nothing we possess The body, like a section of a large flower-pot, or inverted cone cut perpendicularly in two, and hollowed out, is fastened to the wooden axle-tree which has no iron, but terminates in two wooden arms on which the wheels revolve. The horse is very loosely harnessed between the shafts; one, or by hard squeezing, two passengers occupy the seat, whose entire weight rests on the axle, and only the weight of the shafts on the horse; then the driver leaps upon a narrow foot-board behind his passengers, and grasping his reins and flourishing his whip over their heads, sets off at speed, his weight acting as on a lever, of which the axle-tree is the fulcrum, bringing down the hinder part of the vehicle, and making the shafts ascend at a very ambitious angle, their extreme points being often higher than the horse's head. Sometimes a second passenger will jump up behind, but care must be taken not to overload the driver's end of the lever without placing a counterbalance before, for in that case the belly-band, on which is all the pressure, would act unpleasantly on the horse, or even lift him off his feet. If, as frequently happens, a second horse is tied by the side of the other, outside the shafts, this flower pot will travel at a tremendous rate, for the machine itself, made entirely of wood, is very light, and the weight of the passengers and driver, if properly disposed, acts very slightly on the shaft-horse, who, like the comrade by his side, has only to pull.

When new, this particular vehicle is frequently very smart, and even gaudy, the wooden body being painted with flowers and coarsely gilt, the shafts and wheels as dazzling as bright red, yellow, or green can make them, and even parts of the shaft-horse's harness covered with gilding, very much like what is put on our gilt gingerbread nuts. Unfortunately, however, as the Neapolitans choose gaudy rather than lasting tints, and as their colours are badly laid on, and the gilding most inartificially applied, their calessi soon look very shabby.

4th. *Il Calesso.*—We are now come to the vehicle represented by the cut at the head of our article*. This is decidedly the popular machine,—the carriage of the people. Though not so stylish or so fast, it has a great advantage over the "flower-pot" and the "corribolo," for it can carry many more passengers. With some ingenuity and sacrifice of comfort a corribolo may be made to carry four and the driver, and so indeed may a flower-pot; but the calesso has the capacity, on a pinch, of accommodating a round dozen.

So far from being a rare, it is a common thing, to see a rickety machine of the sort thus heavily laden:—three men and women on the seat, and two or three more on their laps or at their feet at the bottom of the chaise, with *some of their* legs dangling out in front of the wheels; three more hanging on behind; a boy or a sturdy lazzarone seated on the shafts, and a couple of little children bestowed in a net fastened to the axle-tree and dangling between the nether part of the calesso and the ground—these constitute the loading of the calesso. To all of these must be added the driver. He either stands up erect with the passengers behind the vehicle, holding the reins and flourishing his whip over the heads of those who are seated within it, or, shortening the reins, places himself on the shafts close at the horse's croup, and there drives away with his legs dependent from the shafts. The two oddest of all the odd circumstances attaching to this calesso are certainly the exhibition of so many legs dangling from it, and the net with the young ones beneath. Accidents, of course, occur now and then. The writer of this was going one morning on horseback from Castellamare to Pompeii, when he was stopped near a cantina or wine-house by the road's side, by hearing the most dreadful shrieks. As he approached the spot, he saw a calesso turn and drive back at speed, and on getting still nearer, saw a female peasant dressed in her gala clothes who was tearing her hair and beating her bosom in a fearful manner. What was the matter? The calesso, crowded as usual on such occasions, was going to a *festa* or fair at the town of Nocera de' Pagani, and on stopping at that wine-house to refresh, it was discovered that the net below with a little boy in it was missing. The rope that held it had given way, and as

* This very spirited representation is copied from a work consisting of "Sketches in Naples and Rome, by M. Gail." From the same source we were enabled to give the Maccaroni Seller in No. 87.

the festive party were probably (as is usual with them when exhilarated by riding) all singing at the tops of their voices, the cries of the child were never heard. The afflicted mother was sure the *guaglionciello** was killed; but presently a joyful shout was heard along the road, and the calesso, returning in company with another vehicle of the same character and similarly loaded, brought back the little urchin, covered indeed, and almost choked with dust, but otherwise safe and sound.

This calesso is generally drawn by two horses, one between the shafts and the other outside of them. These are harnessed in the rudest manner with ropes and string, scarcely an inch of leather being visible. The great inconvenience attending travelling in it is, that the driver is apt to be obliged to stop and get down every quarter of an hour to splice a rope or to make all right with a bit of twine. The capacious body of this calesso is all made of wood. It is generally furnished with a hood of untanned hide which can be brought over the heads of "the insides;" but it has no springs beneath, being merely slung on braces that are *sometimes* made of leather. The driver of a vehicle of this sort is almost invariably a fellow of loquacity and humour, and the best of all sources to go to for notions of the popular habits and feelings of the country. This mainly arises from his considering it part of his duty to amuse his passengers.

The true time to see these popular vehicles in all their glory is, of course, on some grand festival in the city of Naples. In the simple marriage contracts of the female peasantry, there are positive clauses inserted that their husbands shall take them to such and such *feste* in the course of the year. Consequently, when Naples is the scene of the festival, in they come flocking from all parts, every family or set of friends that can afford it driving away in a calesso. These vehicles, when they have been any time in use, are still shabbier than the tarnished "flower-pots;" but ornamented as they are on *some* of the holidays with branches and boughs of trees, with flowers or with clustering nuts, and in *all* with the gay coloured dresses of their occupants, they look sufficiently gay and pleasing.

It has been mentioned that the Neapolitans like to drive very fast, and to sing very loudly while they ride. It is, indeed, too much for the nerves of a sensitive person to see on these occasions how canestre, corriboli, flower-pots, and calessi, gallop along over the hard slippery pavement of the streets, racing with each other, and to hear how their passengers contend in making the greatest noise in bawling and singing, and beating tambourines, while their respective drivers at the same time crack their rude rope whips in concert.

Naples, which has produced some of the finest composers in the world, has been called "the land of song;" and such it is if the good taste and exquisite feeling for music of all classes above the very lowest be alone taken into account. But the popular taste is execrable. The very worst street-ballad that was ever sung by a London beggar, or ground on an organ, is a delicious melody compared to the roaring, shrieking, and, at the same time, droning, whining notes of the lazzarone, or *paesano*†, whose favourite songs, executed in their favourite manner, would frighten a war-horse.

OLD TRAVELLERS.—MARCO POLO.—No. 3.

To convey the future Queen of Persia, a fleet of appropriate magnificence was prepared:—it consisted of fourteen ships, each having *four* masts ‡ and *nine* sails, and four or five of them crews of from two hundred and fifty to two hundred and sixty men each. The emperor furnished this fleet with stores and provisions for two years. At their audience of leave the Poli were further enriched by the generous Kublai "with many rubies and other handsome jewels of great value."

This remarkable expedition sailed from the Peho, or the river of Peking, about the commencement of the year 1291. It was three months in reaching Sumatra, and in a northern port of that island, near the western Straits of Malacca, it waited five months for the change of the monsoon which was to carry it across the bay of Bengal. On his way, thus far, Marco touched at many interesting places, all of which he afterwards described. During the detention of the fleet at Sumatra he was entrusted with the command on shore of two thousand men, there being probably only a few sailors left on board the ships to take care of them. He erected barricades to secure the Chinese from attack, and shortly so far conciliated the wild natives of the island, that they brought regular supplies of provisions to the encampment. The country was divided into eight parts, called kingdoms. As eager as ever for information, Marco visited six of these.

When the fleet sailed from Sumatra it passed the Andaman islands, the inhabitants of which Marco describes as being "idolatrous—a most brutish and savage race, having heads, eyes, and teeth resembling those of the canine species. Their dispositions are cruel, and every person, not being of their own nation, whom they can lay their hands upon, they kill and eat." Mr. R. H. Colebrook, who visited the islands in 1787, concluded that "from their cruel and sanguinary disposition, great voracity, and cunning modes of lying in ambush, there is reason to suspect in attacking strangers they are frequently impelled by hunger; as they invariably put to death the unfortunate victims who fall into their hands*."

From the barbarous Andaman islands the fleet proceeded to Ceylon, many of the particulars of whose inhabitants, customs and productions, Marco describes in a manner little differing from the narrative of Robert Knox, which we recently abridged.

Leaving Ceylon, the fleet traversed the narrow strait which separates it from India, and again came to anchor at the peninsula where Tinevelly and Madura are situated. Here Marco obtained a knowledge of the great pearl fishery, which is still carried on there as well as at Ceylon. He describes how the merchants formed themselves into different companies, how the fishers dived, and employed enchanters to keep off "a kind of large fish," (the shark,) and mentions several particulars confirmed by the Count de Noé and other modern writers, but quite new to Europe at the time the Venetian published his travels.

From visiting the spots himself, or, from the descriptions of Eastern travellers, he collected information respecting Masulipatam, the diamond mines of Golconda, Cape Comorin, the pepper country, the pirate coast, or southern parts of Malabar, Guzzerat, Kambaia, Sumenat, and Makran. In speaking of these extensive countries he is very correct as long as he draws on his own observations, but he is far otherwise when he gives up his belief to the recitals of imaginative Orientals. This is particularly visible in Marco's account of the diamond mines of Golconda, which have been in all ages a favourite theme of Eastern exaggeration and hyperbole. Here he will remind the reader of the adventures of Sinbad the Sailor in the "Arabian Nights' Entertainments." He

* Neapolitan for the Italian "ragazzino," English "little boy."

† Peasant or countryman.

‡ With reference to this passage, Mr. Barrow says, "It is impossible not to consider the notices given by this early traveller as curious, interesting, and valuable; and as far as they regard the empire of China, they bear internal evidence of their being generally correct. He sailed from China in a fleet consisting of fourteen ships, each carrying *four* masts. .... We observed many hundreds of a larger description, that are employed in foreign voyages, all carrying *four* masts."—*Travels in China.*

* Asiatic Researches, vol. iv.

says, that in the diamond mountains, the waters, during the rainy season, descend with fearful violence among the rocks and caverns; and that, when the waters have subsided, the Indians go in search of the diamonds to the beds of the rivers, where they find many. That he was told that in summer time, when the heat is excessive, they ascend the mountains with great fatigue, and greater danger, for the mountains swarm with horrid serpents; that in the deep cavernous valleys near the summit, where the diamonds abound, many eagles and storks, attracted thither by the snakes, their favourite food, build their nests; and that the diamond-hunters throw pieces of flesh into the caverns which the birds dart down after, and, recovering them, carry the meat to the tops of the rocks;—that the men then immediately climb up after the birds, drive them away, and, taking the pieces of meat out of the nests, frequently find diamonds that have stuck to them when thrown into the caverns.

It has been ascertained that the inimitable Arabian Tales were written chiefly about the middle of the thirteenth century, so that, as Mr. Marsden reasons, Marco Polo, on his return homeward at the end of that century, might very well have picked up Sinbad's story of the Valley of Diamonds; though as that gentleman afterwards shows, a similar story had been current in the East long before the "Arabian Nights' Entertainments" were known.

On his way from the coast of Coromandel to Ormuz, in the Persian gulf, Marco describes the islands of Socotra, Madagascar, and Zenzibar, or the southern part of the peninsula of Africa; and gives slight sketches of Abyssinia, and of several cities on the Arabian coast, avowedly on the authority of persons who conversed with him and shewed him maps of those countries and places. Speaking on this dubious authority, he has introduced in his description of Madagascar that monstrous bird the rukh, or roc—another fable of the Thousand and One Nights. With greater truth he mentions the camelopard, and when speaking of the African coast he correctly describes that interesting animal, whose existence was long called in question. He says it is "a handsome beast. The body is well proportioned, the fore-legs long and high, the hind-legs short, the neck very long, the head small, and in its manners it is gentle. Its prevailing colour is light, with circular reddish spots."

After eighteen months' navigation in the Indian seas, the Chinese fleet reached Ormuz, the place of their destination, which was in the territory of King Arghun, the destined husband of the Tartar princess, who had occasioned this (for the time) extraordinary voyage. "And here it may be proper to mention," says Marco, "that between the day of their sailing and that of their arrival, they lost by death, of the crews of the vessels and others who were embarked, about *six hundred persons*: and of the three Persian ambassadors only one, whose name was Goza, survived the voyage; whilst of all the ladies and female attendants one only died *."

A dreadful calamity, however, awaited the princess, who had come all the way from China to Persia for a husband. This was nothing less than the death of that very husband.

"On landing," says Marco, "they were informed that King Arghun had died some time before, and that the government of the country was then administered, in behalf of his son, who was still a youth, by a person of the name of Ki-akato." On communicating, by letter, with this regent, they were instructed to convey the widowed bride to Kasan, the son of Arghun and his successor to the throne, who was at the Portæ Caspiæ, or Caspian Straits, with an army of 60,000 men, to prevent an expected hostile irruption. The Poli made this journey, which must have been in itself of considerable danger or difficulty, and placed their imperial charge in the hands of the young prince. From the camp of Kasan the Poli went to the residence of the regent Ki-akato, "because the road they were afterwards to take lay in that direction." "There, however," continues Marco, "they reposed themselves for the space of nine months." When they resumed their journey homewards the regent furnished them with tablets or passports, like to those of the Grand Khan, and moreover ordered that in turbulent districts they should have an escort of 200 horse.

After these long and perilous adventures, the Poli at length were fairly on their way home Marco says, "In the course of their journey (*that is, after they had left the residence of the Persian regent, which appears to have been Tabriz*) our travellers received intelligence of the Grand Khan (Kublai) having departed this life, which entirely put an end to all prospect of their revisiting those regions. Pursuing, therefore, their intended route, they at length reached the city of Trebizond, whence they proceeded to Constantinople, then to Negropont, and finally to Venice, at which place, in the enjoyment of health and abundant riches, they safely arrived in the year 1295. On this occasion they offered up their thanks to God, who had now been pleased to relieve them from such great fatigues, after having preserved them from innumerable perils."

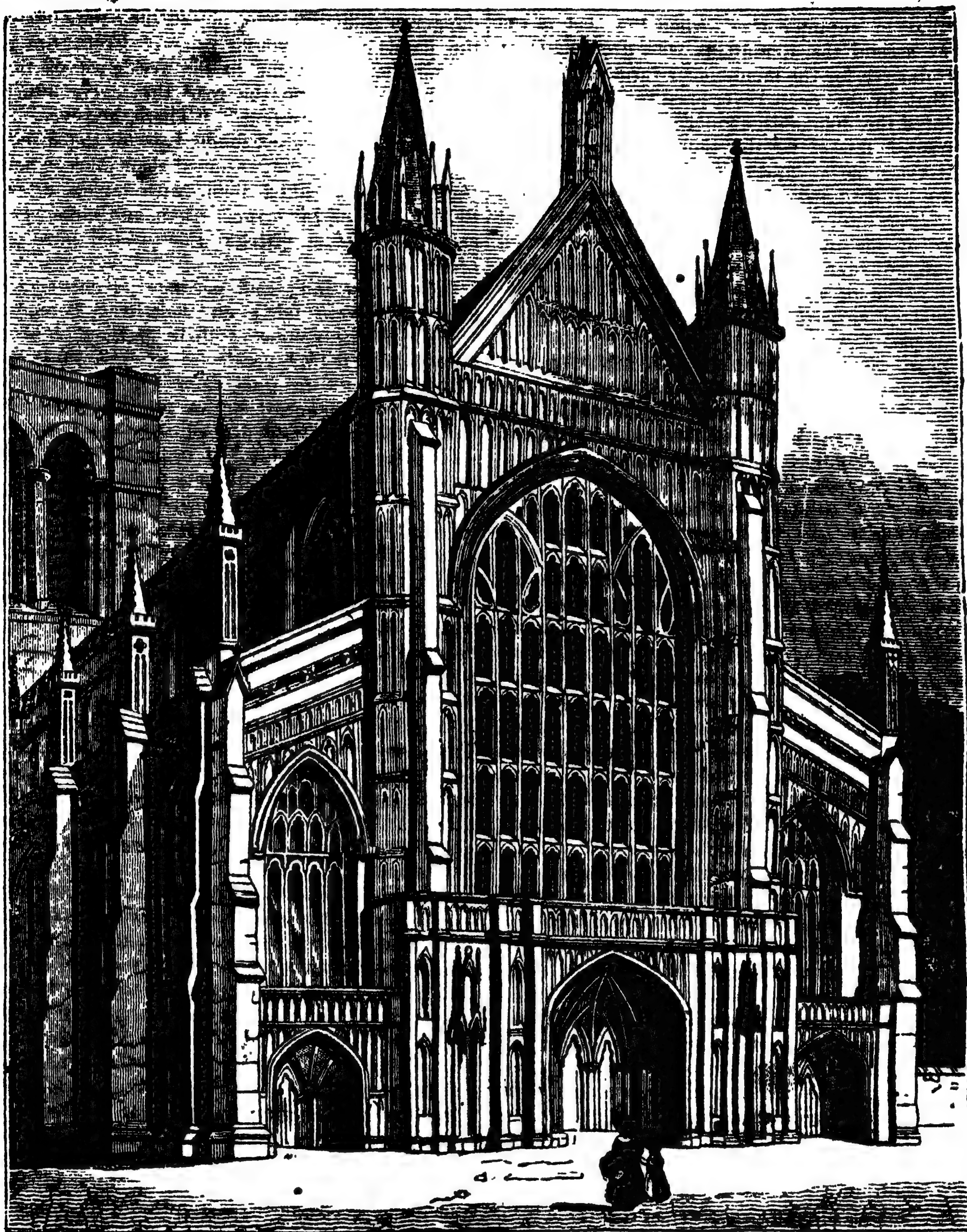
CATHEDRAL OF WINCHESTER.

The origin of the city of Winchester lies concealed in the farthest depths of our British antiquities. Tradition, and the evidence of our oldest historical monuments, concur with the probability afforded by the situation of the place in making it out as having been one of the earliest settlements of the first inhabitants of the island. In this way it may possibly have existed as a village in the woods for a thousand years before the Christian era. When the Romans first landed in Britain, about half a century before the birth of Christ, the tract of country in which Winchester stands appears to have been peopled by a Belgic tribe, who had come over from the continent about two hundred years before. It is said that the British name of Winchester was then Caer Gwent, or the town of Gwent, which the Romans Latinized into Vinta, calling it commonly the Vinta of the Belgæ. If it had been, as is commonly thought, the capital of England in the times of the Britons, it regained that distinction under the Saxons, on the union of the country under one sceptre in the beginning of the ninth century, by Egbert, king of Wessex, to whose original dominions it had belonged. From this time till the reign of Edward the Confessor, in the middle of the eleventh century, Winchester retained the dignity of chief city of the realm. Here Alfred and Canute principally resided and held their courts. Even after the erection of the abbey and palace of Westminster by the Confessor, and the attachment which he showed to that neighbourhood, had crowned the long-rising importance of London, Winchester continued for a considerable period to dispute pre-eminence with its rival. During the reigns of the Conqueror and his two sons, in particular, it may be said to have still maintained an equality with London. It was not perhaps considered to have altogether lost its old metropolitan supremacy till the reign of Richard I., towards the close of the twelfth century.

Reduced now to a town not containing, by the last census, quite ten thousand inhabitants, modern Winchester derives its chief importance from the ancient and

* Mr. Marsden remarks that "this mortality is no greater than might be expected in vessels crowded with men unaccustomed to voyages of such duration, and who had passed several months at an anchorage in the straits of Malacca; and although it should have amounted to one-third of their whole number, the proportion would not have exceeded what was suffered by Lord Anson, and other navigators of the seventeenth and eighteenth centuries."

splendid ecclesiastical establishment of which it is the seat. While the other bishops take rank according to the date of the consecration of each, the Bishop of Winchester holds permanently the next place after those of London and Durham, who stand next to the two archbishops, and before all the rest of the episcopal bench. In point of opulence, also, this see has always been reckoned one of the first in England.



[North-west view of the Cathedral at Winchester.]

The foundation of this see, and also that of the Cathedral of Winchester, have been carried back so far as the middle of the second century after the birth of Christ, when, it is affirmed, the British King Lucius, having become a convert to the true religion, erected here the first Christian church on the site of the chief Pagan temple. This legend, however, rests on too uncertain authority to be entitled to much regard. All that we really know of the ecclesiastical history of those times is, that Christianity was undoubtedly introduced into the island in the course of the first century; that the converts among the Roman settlers were some time after considerable for their numbers; and that it had been generally diffused among the British inhabitants prior to the Saxon invasion. It was not till after the commencement of the seventh century that the Saxon kings and people of Wessex were induced to relinquish Paganism. The first of the former who was baptized was Kinegils, the great-great-grandson of Cerdic, the founder of the dynasty. His conversion, which took place about the year 635, and which was speedily followed by that of the greater number of his subjects, is attributed to St. Birinus, who had been sent over to preach the Gospel from Italy by Pope Honorius, and is accounted the first Bishop of Winchester. Kinegils began the building of a cathedral, but his death, which took place soon after, prevented him from carrying it much beyond the foundation. The work, however, was continued by his son and successor Kenewalch, and brought to a conclusion in 648, when it was dedicated to the Holy Trinity and to the Apostles Peter and Paul.

This edifice is described as having been of great extent and magnificence; but any considerable building of stone, which is said to have been the material em-

ployed in the present instance, was calculated to excite admiration in that age. It stood, there can be no doubt, on the same spot which is occupied by the existing cathedral. In 871, however, in an attack made upon the city by the Danes, the sacred structure appears to have been, if not entirely demolished, so terribly injured as to have been reduced to little better than a ruin. It is probable that it was repaired by the great Alfred, when, some years after, he regained the throne of his ancestors; but in the middle of the next century we find the fabric to have fallen again into such complete decay, that the then bishop, St. Ethelwold, determined to pull it down, and rebuild it from the foundation. St. Ethelwold's Cathedral was finished in the year 980.

Much controversy has taken place among writers on the architectural antiquities of Winchester, as to whether any or how much of the building erected by St. Ethelwold remains in the present cathedral. Some have contended that the entire church was rebuilt about a century after by Bishop Walkelyn, the prelate who was first appointed to the see after the Conquest; and certain of the statements of the old ecclesiastical historians would seem to imply that this was the fact. It seems to be generally acknowledged, however, that the character of the architecture of part of the east end is nearly decisive in favour of its superior antiquity to that of the rest of the church, and especially of the tower and those portions of the transepts and nave which are known to be the work of Walkelyn. Some have even contended, on evidence of a similar description, that parts of both the transepts and the nave must be considered to be of the age of Ethelwold.

The central tower, however, was undoubtedly built by Bishop Walkelyn, whose repairs and additions, whatever was their extent, were regarded as so important, that, upon their completion in 1093, the church underwent a new dedication to St. Peter, St. Paul, and St. Swithin. After this, a portion of the east end was rebuilt towards the close of the eleventh century, by Bishop Godfrey de Lucy. But the most important improvements which were made on the original structure were those which were commenced soon after the middle of the fourteenth century, by Bishop William de Edyndon, and continued and completed by his illustrious successor the celebrated William de Wykeham, who held this see from 1366 to 1404. The latter prelate may be said to have rebuilt nearly the whole of the cathedral to the westward of the central tower; and to him in particular is to be attributed the construction of the great west front, which is by far the most magnificent part of the edifice as it now exists. Finally, in the early part of the sixteenth century, a considerable part of the church to the east of the central tower was restored by Bishop Richard Fox, another of the most distinguished prelates by whom this see was ever governed.

The Cathedral of Winchester, it will be perceived from this sketch of its history, may be regarded as a nearly complete record and exemplification of all the successive changes in the Norman style of architecture, from its rise, or at least its introduction into this country, in the eleventh, till its disappearance in the sixteenth century. The building is in the usual form of a cross; and is one of the largest of our cathedrals, its length from east to west being five hundred and forty-five feet, and the breadth of the nave and aisles eighty-seven feet. The length of the transepts from north to south is one hundred and eighty-six feet; and the roof of the nave is seventy-six feet in height. With the exception of the west front—which, with its noble window, its buttresses and pinnacled turrets, and the canopied statue of Wykeham, that crowns its pointed termination, has a grand and imposing effect—the exterior of the church has but little to recommend it. The extreme plainness of its architecture, its long unbroken continuity of roof, and its short and squat tower, give it altogether rather a homely and almost heavy air. Placed as it is, besides, in a low situation, were it not for its immense mass, it would scarcely have anything to distinguish it from the undecorated buildings by which it is surrounded. The interior, however, is such as amply to make up for this deficiency of outward display. The vast length of the vista formed by the nave and choir, with the splendid ceiling overhead,—the lines of columns and arches on each hand,—and the large and beautiful window that casts its light down from behind the choir, at the termination of the view,—all contribute to produce upon the spectator, as he enters from the great western door, an overpowering impression of solemnity and magnificence. And when he proceeds to examine the objects by which he is surrounded more in detail, he discovers everywhere a richness of ornament which it is impossible to look upon without admiration. Not to speak of a profusion of modern monuments, there are placed in different parts of the church various ancient chantries and tombs, exhibiting some of the finest efforts of Gothic sculpture in the world. The chantries, in particular, of William of Wykeham, of Bishop Fox, of Cardinal Beaufort and of Bishop Waynflete, are structures of the most superb description. Behind the altar also is a stone screen erected by Bishop Fox, a work of wonderful elaboration and beauty. The altar is ornamented by West's picture of the Raising of Lazarus from the Dead, one of the most successful works of that master. Many venerable relics of antiquity are likewise here preserved, of which we cannot attempt a detailed notice.

THE GRAIN WORMS—*Vibrio Tritici.*—

(*Concluded from* No. 86.)

[We regret that the limits of our little work prevent us giving the communication of Mr. Bauer as fully as we could have wished. The details of his experiments are exceedingly curious and instructive; but we can only afford space for their more important results.]

The existence of this most extraordinary disease in wheat has been, comparatively speaking, but a very short time known; and it is only of a very recent date that it has attracted the notice of the practical agriculturist in this country. In July, 1807, I received, for the first time, some growing specimens of wheat-plants infected with this disease, from Kent, where it was said that the disease had existed some years, and, from its spreading, had attracted the notice of the farmers. They distinguish it by the odd names of *Ear-Cockles*, or *Brown Purples*, on account of the distorted shapes and dark-brown colour of the diseased wheat-grains, which bear some resemblance to a weed generally growing in corn-fields, and vulgarly called *Corn-Cockles*, or *Purples*, the *Agrostema Githago* of Linnæus. In Hampshire the disease is called *Burnt Corn*.

From continued supplies of fresh specimens from Kent, I have been enabled to ascertain many important facts respecting the nature and properties of the minute animals engendering this disease. These experiments and results were so far satisfactory as to establish incontestably the fact, that the white fibrous substances within the cavities of the distorted grains consist of real organized animals, endowed with the extraordinary property of having their power of motion suspended for a considerable length of time, and of having it again restored by the mere application of water. But how are these animals introduced into the cavities of the young germens? and how are they propagated? These were questions which I could not at first answer, and I considered that these facts could only be ascertained by tracing the worms from the sowing of the seed-corn through the whole progress of the vegetation of the plant.

Being fully convinced that the worms or their eggs, like the seeds of the fungi of the pepper-brand and dust-brand, must be absorbed by the germinating seed-corn, and propelled by the circulating sap into the young germens, and reflecting that I had successfully inoculated the wheat-grains with the fungi, I determined to try the same experiment with these worms; accordingly I selected a sufficient number of sound wheat-grains, and extracting a small portion of the worms from the cavities of the infected grains, (which had been previously soaked in water about an hour,) and placing some in the grooves on the posterior sides of the sound grains, I left them for some days to get dry, and planted them in the ground on the 7th of October, 1807. At the same time I planted some sound wheat-grains in separate holes, about two inches deep, and in each hole two or three infected grains also. About the middle of November most of the seeds had come up, and from time to time I took some of these young plants for examination, but did not perceive any effect of the inoculation till the 3rd of December, when, out of nine plants, five proved to be infected with live worms. In the first plant, after carefully splitting the young plant from the root upwards, I found in the then unorganized substance, between the radicle and the plumula, three young worms very lively, but not much larger than those with which the seed-corn was inoculated; in another plant I found one full-sized worm, but no eggs about it; in the third plant I found a still larger worm than the last, but in dividing the stem I had cut the worm in two, and it soon died; it seemed to be full of eggs: in the other two plants I found some worms quite young, and some half grown; but on the other four plants the inoculation had no effect. The fact that, at such an early stage of the vegetation of these inoculated seed grains, such large worms were found, confirms my first supposition, that it requires several generations of these worms to introduce their eggs into the young germens; the large worms found in the substance of the young stem were undoubtedly some of the original worms with which the seed-corn was inoculated, for they were on the point of laying their eggs in that stage, and these eggs, being again propelled by the rising sap a stage further, then come to maturity, and again lay their eggs, and thus progressively reach the elementary substance of the ear, where they are finally deposited in the then forming germens; the whole progress probably requiring three or four such reproductions.

(Mr. Bauer then describes many subsequent examinations of infected plants, referring to the representations and descriptions given in No. 86. A detailed account of the nature and properties of these worms was laid before the Royal Society, read on the 5th of December, 1822, and published in the "Philosophical Transactions" of 1823, under the title of "Microscopical Observations on the Suspension of the Muscular Motions of the Vibrio Tritici.")

My experiments, for resuscitating the grain-worms, I have repeated almost every succeeding year to this day, and always with the same success; but I find that the longer the specimens are kept dry, the grains require to lay in water a greater length of time before the worms will recover; and that, at every repetition of an experiment, a smaller number of worms recover their motion, and that after the same specimens (the produce of the grains inoculated in 1807) had been kept dry *six years and one month*, the worms were all really dead; this period is the longest which I have as yet ascertained that these worms can retain their reviviscent quality.

That this disease is contagious, is sufficiently proved by the fact, that it can at pleasure be successfully inoculated on the soundest seed-corn. The infection, however, is not so generally nor so readily communicated as the diseases occasioned by the fungi of the smut-balls or dust-brand, a few infected ears of which are capable of contaminating and infecting the whole contents of a barn. Grains infected with these worms having no embryos, cannot vegetate and produce again diseased grains themselves, but can only communicate the infection by coming in contact with the germinating seed-corn in the soil, by the moisture of which the worms are revived and extricate themselves, which I have so often observed they do when kept some time in water.

Steeping the seed-corn in lime-water, in the same manner as advised for preventing the diseases occasioned by the fungi, is the most efficacious method of preventing the spreading of this disease. I have repeated the experiment by inoculating, very strongly, sound wheat-grains with the worms, and afterwards steeping them in lime-water, and the infection was always prevented; I have also steeped some sound wheat-grains in lime-water, and after having kept them in a dry state for some days, I inoculated them strongly with the worms, but on examining the plants, not one instance of infection occurred. From these facts it is evident, that properly steeping the seed-corn in lime-water before sowing, is a sure preventive of the disease occasioned by grain-worms. F. B.

THE DEAF TRAVELLER.—No. 8.

Heat of the Climate—Thirst.

The first day's journey from a great city in Europe seldom presents aught to the traveller to awaken the suspicion that more than an excursion of pleasure lies before him. In the East it is not so. Generally one comes upon a city with little previous intimation of its existence, and, on leaving it, soon enters on scenes as wild and rude as those of the wilderness. It was so with us. The first day's journey was a type of many following days, and was not calculated to fill our minds with very sanguine expectations of enjoyment from the travel we then commenced.

Our road lay over a parched and barren plain, with no cultivation except in the immediate vicinity of Bagdad. Indeed, in this part of the country, cultivation is seldom found but in the near neighbourhood of towns and villages; nor perhaps could produce be raised beyond the vicinity of the rivers, now that the magnificent and extensive system of aqueducts and canals is completely ruined, which the kings reigning in Babylon and Susa seem to have created, and by which this territory was once watered and made amazingly fruitful *. For there are several months—nearly half the year—in which not a drop of rain falls; and the climate is so intensely warm that, without some mode of irrigation, every green thing dries up as if it had been baked in an oven. In the month of July, at Bagdad, I have known the quicksilver in the thermometer stand in my *cool* room at 102° of Fahrenheit, at 118 in the open shade, and at 142° after a few minutes' exposure to the sun. If it be asked how Europeans can at all live in so warm a place, I will just mention, that they, in common with the more respectable natives, remain in cellars during the greater part of the day, and sleep at night on the flat roofs of their houses. The dark and damp vaults are not particularly agreeable to those who are accustomed to well-furnished rooms, with carpeted floors, and the cheerful light streaming in at the windows.

Well, we rode over this burning plain, without so strong a consciousness of the blessings of sunshine as in England one is apt to entertain. I soon felt that I was getting thirsty, and reposed with much complacency on the consideration that I had a bottle of water below me. The men also became thirsty, though better able from use to bear thirst than an European. One of them spied out my bottle, and, without asking my leave, came

* In a former excursion we were much interested by the ruins of the aqueducts and canals in Sitacene and Babylonia.

to help himself to a draught. I certainly had no objection, though I thought he might as well have consulted me in the matter. The man, however, spurted out his first mouthful with great abhorrence; and, on inquiry, I made the felicitous discovery, that the servant at Bagdad, instead of filling it with pure water, had loaded it with red clay and water, with a far more than equal proportion of the former. The motion of the horse had well compounded the ingredients into mud, which even an Arab could not tolerate as drink, though the natives are by no means squeamish when thirsty.

On inquiring when we should arrive at some water, I could learn of none nearer than the river Dialah, and many long hours must elapse before we could reach it. The men, more provident than we, had furnished themselves with melons, and so intense was my longing for something to moisten my mouth, that I could not control my inclination to beg a piece from them. Ishmael, our own muleteer, though not in the best of humours with us, readily gave me a slice; and I do not remember when melon ever seemed more delicious to me.

The Dialah flows in a deep bed, but we saw at last the palm trees which in some places adorn its banks. But on so level a plain the palms appeared more than three hours before we reached the stream; and when we at last arrived, after a ride of eight hours in the scorching sun, I found all my little skill in horsemanship put into requisition to enable me to retain my seat while my sure-footed beast found its way down the nearly perpendicular bank, and then to guide him through the rapid stream. He paused in the midst of the current to quench *his* thirst, regardless of mine. What Tantalus felt I knew, when I sat with water all around me without the power of drinking. I was mounted too high on my baggage to be able to stoop low enough to dip up a draught in the pewter cup I carried in the bosom of my gown; and there was no one who cared to help me, the attention of each man being engaged in getting himself or his beast across.

When I reached the opposite bank, I saw no one near on foot to hand me up drink; and I was afraid to dismount, not knowing how I should be able to ascend again, without assistance, to my elevated position. I, therefore, after pausing a few minutes to see if I could perceive any one who might help me, left the river with a heavy heart and a parched throat; disappointed in all the sanguine hopes with which I had for the preceding three hours been regarding the palms in the distance. I saw gardens and plantations before me, however; and was happy in supposing that our resting-place was not far off, knowing that I should there be able to drink my fill. But going on and on, without reaching the village, I began to suspect that the resting-place might yet be a good way off, and determined that, at all events, my thirst *should* be appeased at the first pond, marsh, puddle, pool, or stream, I might fall in with.

Soon after this determination, I saw a little rill stealing down the lane it made green, and eagerly threw myself off my horse. But having two objects of attention,—one to retain the bridle of my stubborn beast, and the other to obtain a draught,—I got entangled up to my knees in the deep ditch mud through which the little stream flowed, and also fell forward on my hands, begriming my front, and my sleeves up to the elbow. I drank cup after cup, laughing to scorn all that doctors tell about the evil of taking the cool beverage in such circumstances.

To one who has never known that agony of thirst which a traveller in the East must often experience, the miseries of this day may seem light. But, if I may be allowed to judge from a tolerably ample experience of most of the miseries which flesh is heir to, I will venture to affirm, that there are few physical sufferings comparable to that of thirst in a hot climate, and no physical pleasure equal to its gratification. In England few experience thirst more strongly than to make the desire for drink an appetite—a strong inclination: in the East the same desire must often become quite a passion—a rage. As this was the *first* suffering of the kind in the present journey, I have been the more particular in speaking of it, that the reader may the better apprehend something of what the writer means by the general mention of *thirst* hereafter. I calculated that my leathern bottle being *seasoned*, would preserve me from this kind of suffering in future; but it was stolen the following night; and when, afterwards, I bought another in Kermanshah, it very soon went the way of the former. But, upon the whole, I think that during the earlier part of the journey I never suffered so much in the matter of thirst as in the first day, though I have often been much longer without water. This may be accounted for by our getting into more elevated regions, and among mountains, where the heat, though often great in the valleys, is much less than in the plain of Bagdad.

The following cut, which is taken from the "Menageries," vol. i., in some respects illustrates the scene described above; with this difference, that the representation here given applies to the Caravan of Commerce.

[To be continued.]

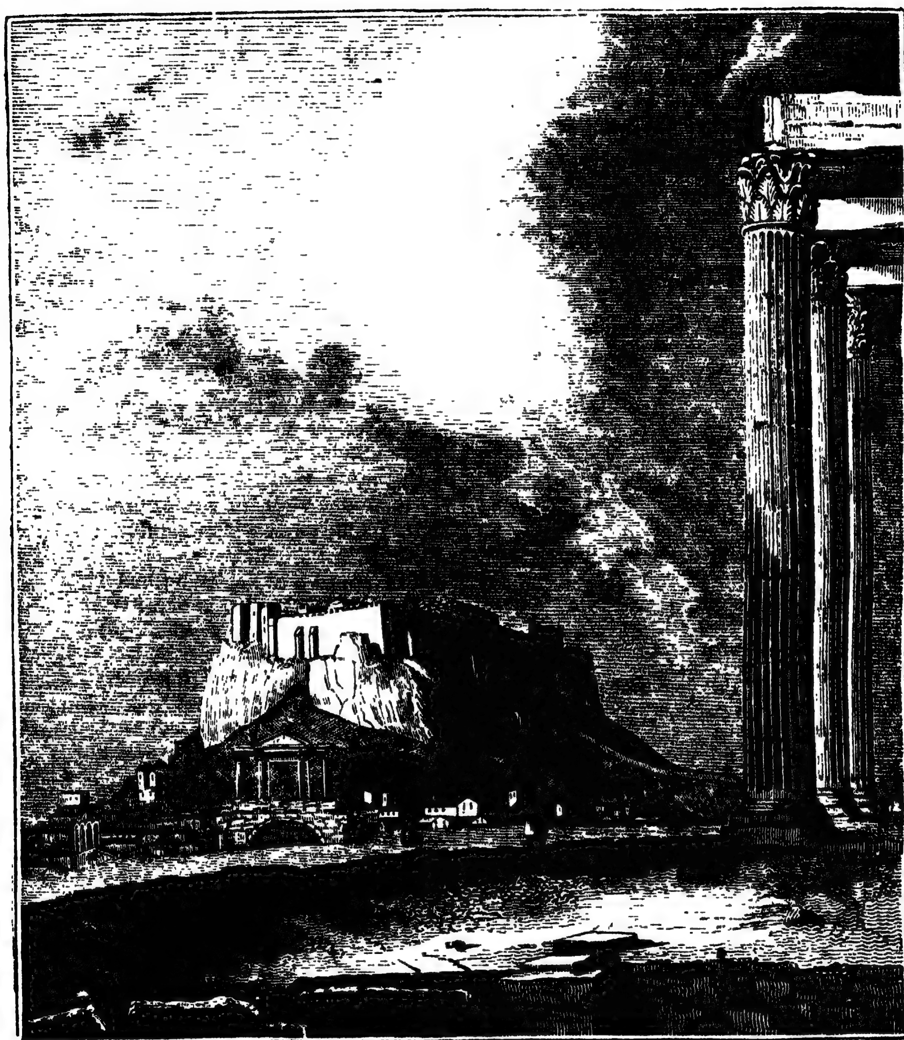


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THE BRITISH MUSEUM.



[View of the Acropolis.]

A VOLUME of the Library of Entertaining Knowledge, entitled "The British Museum—Elgin and Phigaleian Marbles, vol. i.," has just been published. After a brief introduction, explanatory of the circumstances by which these inestimable specimens of Grecian art were procured and finally lodged in our museum as national property and models to refine our national taste, the volume before us goes on to sketch the topography of Athens and its neighbourhood, whence these relics of genius were obtained.

This sketch was necessary to work out the history of the marbles, and to connect those dissevered and too often mutilated fragments now ranged round the walls of a room in London, with their original site and condition in the city of Minerva. Included in this chapter of topography, the Acropolis of Athens, an insulated rock which was once literally covered with architecture and sculpture; Mount Pentelicus, whose quarries of excellent marble furnished the material for all those matchless edifices and statues; Mount Hymettus, whose aromatic plants gave that exquisite flavour to the honey of the Attic bees, so much celebrated by the ancient poets of Greece, and whose delicately-tinted marble supplied the rich Romans with materials to decorate their palaces; the streams of the Ilissus and Cephisus; the sea-ports of Athens, or the Pyræus, Munychia and Phalerum; the ancient walls of the city, and other scenes and objects whose mere names fill the informed mind with great ideas,—these are all concisely described on the authority of writers of classical antiquity, confirmed by the observations of modern travellers.

This chapter is appropriately followed by the history of Athens, as far as it is connected with the history of its public edifices and the purposes for which they were designed. It is, in fact, a condensed history of the fine arts of the Athenians, with a melancholy appendix of their decline and fall, and the spoliations and destructions to which their works have been successively sub-

jected by Macedonians, Romans, Goths, the Christian Emperors of Constantinople, Turks and Venetians. To these details succeeds an account of the general plan and proportions of the temples of ancient Greece. This tends still further to connect the Elgin and Phigaleian marbles with the places of their original destination; and to impart to the reader's mind the impression they must have made, when, perfect from the hands of the great artists that first produced them, they stood above or in the midst of graceful columns, forming an essential part of a magnificent whole, to which they gave and from which they borrowed beauty.

Chapter the fifth is devoted to the history of sculpture among the Greeks, from their first starting as humble imitators of the Egyptians or Etruscans, till, by effort after effort, and improvement slowly and laboriously added to improvement, they finally came near to perfection just before the period of Phidias, who was destined to attain it.

The next section is occupied by Phidias, his contemporaries, and the era the most glorious for art that the world has ever known.

"Phidias," says our author, "the great master of the art of statuary, was born at Athens in the seventy-third Olympiad, about four hundred and eighty-eight years before Christ. He was the son of Charmidas; and, as Pliny informs us, was at first a painter. Eladas the Argive, and Hippias, are said to have been his instructors in the art of sculpture.

"Of the rudiments of his education we are uninformed; but Athens was, at this time, the great school of arts and letters: from Homer, whose poems he had deeply studied, he drew images of greatness, which he afterwards moulded in earthly materials with a kindred spirit; and it is presumed that the discourses of contemporary philosophers on mental and personal perfection, contributed in no slight degree to stamp his works with a character of sublimity. His mind was adorned with all the knowledge which could be useful to his profession. Phidias was also skilled in history, poetry, fable, geometry, and the optics of that day; and, whilst Pericles commanded the treasury of Athens and the allied states, had the means of giving full scope to the efforts of his genius.

"In the art of making statues in bronze, both for the number and excellence of his works, Phidias was without a rival. In the production of ivory statues, also, he stood alone; nor did he disdain to work in the meaner materials of wood and clay, or to execute articles of the smallest mechanism.* . . . . This was the man to whom Pericles, in the day of his greatness, consigned the direction of the public works at Athens; and under whose choice of workmen the temple of the Parthenon was produced." (From this very temple, the reader will remember that all those exquisite statues and figures in high and low relief, which are now called the Elgin marbles, were obtained.)

Among the most celebrated of the works which Phidias executed with his own hands, were, a statue of Minerva which adorned the interior of the Parthenon, another of Minerva which stood in the open air on the Acropolis of Athens, a statue of the goddess Nemesis, "made in derision, from the block of Parian marble which the Persians had brought thither to erect as a trophy of their expected victory at Marathon," and a statue of Jupiter, believed to have been nearly sixty feet high, which was placed in the interior of the temple of the Altis, or grove, in the neighbourhood of Olympia†.

"When a friend inquired of Phidias from what pattern he had formed his Olympian Jupiter, he is said to have answered by repeating those lines of the first Iliad, in which the poet represents the majesty of the god in the most sublime terms; thereby signifying that the genius of Homer had inspired him with it. Those who beheld this statue are said to have been so struck with it as to have asked whether Jupiter had descended from heaven to show himself to Phidias, or whether Phidias had been carried thither to contemplate the god."

The seventh chapter of the volume includes a particular description of the Parthenon. We have already mentioned that the stately edifices on the Acropolis of Athens, as well as the sculptures, were formed of marble from the quarries of Mount Pentelicus. This marble, when dug, was white, and in the fine atmosphere of Attica it retained its purity of hue. Forty-six columns of this beautiful material, each six feet two inches in diameter, and thirty-four feet in height, composed the exterior of the Parthenon, which stood upon a pavement, to which there was an ascent of three steps. The total height of the temple above its platform was about sixty-five feet —its length was two hundred and twenty-eight feet, and its breadth one hundred and two feet. Simplicity characterized the construction of every part of this magnificent building, "which," says Colonel Leake, "by its united excellences of materials, design, and decorations, was the most perfect ever executed."

In Number 28 of the Penny Magazine, we have briefly alluded to the fate of the Parthenon in the course of the centuries that have elapsed since it was erected, and may now refer the reader to this section of the work before us for an ample account of the sad vicissitudes it has undergone.

A description of the sculptured Metopes which in very bold relief ornamented the frieze of the temple, and an explanation of their subject,—the combats of the Centaurs and Lapithæ, with other analogous matter, are contained in the eighth chapter. The ninth is devoted to the Panathenaic frieze, which, as an uninterrupted series of sculpture in low relief, occupied the upper part of the walls within the colonnade; the subject of those works was a sacred procession of all the Athenians, celebrated every fifth year in honour of Minerva, the guardian divinity of their city.

In this and the preceding chapter, the most beautiful of these marbles, which are now in our Museum, are so represented and arranged that the volume may serve as a guide to those visiting the collection. The tenth chapter treats of the sculptural pediments of the Parthenon—a very important part of the temple; and the eleventh, and last chapter of the volume, is occupied with an explanation of the allegories of those pediments, from the pen of R. Westmacott, Esq., a distinguished British sculptor.

As embellishments, or rather as necessary parts, the volume contains a view of the Acropolis of Athens, an outline map of that city, a plan of the Acropolis, showing the precise situation of the Parthenon, &c., and nearly one hundred spirited engravings of the Elgin marbles themselves *.

Though, from the nature of the subjects, the volume includes many points of erudition, these will be found treated in a manner alike intelligible to the scholar and to the man of plain education. Indeed, one of the principal aims has been to render the classical objects essentially popular. The time has gone by when all matters of taste and antiquity were hedged in by conventional barriers, and pedantry locked up what ought to be open to all.

* As fish and flies. The Roman poet Martial, noticing some fish which Phidias had sculptured, commends their truth to nature in three words—"adde aquam, natabunt,"—"give them water and they will swim."

† See "Penny Magazine," No. 73, p. 113.

* The view of the Acropolis, at the head of this article, is not the one given in the volume.

DOMESTIC ARCHITECTURE.

Mr. Loudon, who has deservedly attained a high reputation for his Encyclopædias of Agriculture, and Gardening, has just completed an "Encyclopædia of Cottage, Farm, and Villa Architecture." The work is published in twelve parts, at five shillings each. It comprises between eleven and twelve hundred closely-printed pages, and is illustrated with more than two thousand wood-cuts and lithographic engravings. The main object of this Encyclopædia is stated to be "to improve the dwellings of the great mass of society, in the temperate regions of both hemispheres: a secondary object is to create and diffuse among mankind, generally, a taste for architectural comforts and beauties."

We consider the objects thus proposed to be attained as of the highest importance to the general welfare of the community. The progress of civilization is in no respect more clearly indicated than by the character of the buildings in which the mass of any people reside. It is quite possible that the public edifices of a country —its palaces and its theatres—may be erected in the purest taste, and with the highest magnificence; and that the cottage of the peasant and the artisan may be wanting in every comfort and convenience, and be utterly destitute of proper ornament. In such a state of society Architecture will be only encouraged by the most wealthy; and its principles as an art will only be considered applicable to the more expensive forms in which they can be displayed. The first indications of an extended desire for some qualities in a building beyond the common ones of warmth and shelter, are presented in very clumsy attempts at finery in the houses of the wealthier portions of the middle classes. The *box* of the rich citizen, with its monstrous inconveniences and fantastic decorations, is for a long time the object of contempt. But at length a new era arrives. Those who practise architecture as a profession are tired of waiting for the rich prizes of their calling. They discover that the many are the best customers; and that the hundreds, who build snug houses at the cost of £500 or £1000, have more money to lay out than the one who expends £50,000 upon a mansion. In the mean time a few good examples of correct taste, and the gradual dissemination of a knowledge of those principles of art which are equally applicable to the cottage and the palace, render those who build houses desirous of something more satisfying than the ugly and uncomfortable edifices of their forefathers. They learn that a building is not necessarily more expensive, because its rooms are of just proportions, and its ventilation perfect. They learn, also, that even their furniture may be in the best taste, without being dearer, or perhaps so dear, as the vulgar assemblage of a great many rude articles and a few fine ones, which used to be found in the tradesman's parlour, and even in the merchant's drawing-room. At length the suburbs of a great city, such as London, become rich with elegant villas; in which there is not only much substantial comfort for the inhabitants, but where they are habitually surrounded with objects which keep alive in them the sense of the beautiful. That they are happier and more virtuous through such associations we cannot doubt.

But while this change is taking place a still more important change is going forward, which affects the happiness of a much larger body of the people. The mud hovel is gradually displaced by the neatly-whitened cottage; the reeking dunghill before the door is thrust away by the pretty flower-garden; the honeysuckle climbs about the porch, and the china-rose drops around the latticed windows. The house within is, in too many cases, ill provided with comforts that might be easily obtained: it is indifferently ventilated; there is a great waste of fuel caused by the construction of the fire-places; the furniture is coarse and inconvenient. It is evident that science has not been called in to the aid of the builder; and that the inhabitants have yet much to learn before they are prepared to wish that in their hours of leisure they should be surrounded by objects which might assist in shutting out the desire for coarse enjoyments, by making home delightful.

It has been the constant endeavour of our own little work to raise the standard of enjoyment amongst the great mass of the people; because we believe that the standard of morals will be elevated in the same proportion. If there ever was a time, which we greatly doubt, when want of knowledge and want of refinement could be received as any securities for virtue and happiness, that time is passed away. We, therefore, think ourselves especially called upon to lend our aid in making Mr. Loudon's Encyclopædia of Architecture more generally known; because we feel that the universal diffusion of a love for what conduces to our domestic comfort, and raises our domestic tastes, is most intimately connected with the general prosperity of the community. Most of us want a great deal of the information which is contained in this Encyclopædia. In the country, the greater number of those who build are their own architects; and even if they seek professional assistance they encumber their adviser with projects and objections arising out of their own complete ignorance of what is essential to economy as well as convenience, to say nothing of taste. Mr. Loudon well observes, "The necessaries and even comforts of life are contained in a small compass, and are within the reach of a far greater portion of mankind than is generally imagined. But one room can be used at a time, by either the poor man who has no other, or the rich man who has several; and that room can only be rendered comfortable by being warm, dry, light, well ventilated, and convenient: qualities which depend not so much upon the materials used in its construction, as on the manner of applying them. All that is wanting is knowledge; first, of what is necessary and desirable; and, secondly, of the means of obtaining it at a small expense."

Mr. Loudon's Encyclopædia of Architecture is divided into four Sections, or Books, viz.:—

I. Designs for labourers' and mechanics' cottages, and for dwellings for gardeners and bailiffs and other upper servants, and for small farmers and cultivators of their own land.

II. Designs for farm-houses and farmeries, country-inns and parochial schools.

III. Designs for villas.

IV. Principles of criticism in architecture.

The three first books are each treated in the same way, which appears to us excellently adapted to diffuse a knowledge of the principles and practice of architecture. The author, in each department, first presents several model designs, with very detailed descriptions, and with estimates; he next gives a great number of miscellaneous designs, some furnished by competent architects, others taken from buildings actually executed; and lastly, he supplies minute directions as to the interior fittings in each department, with drawings of all the more important articles of furniture. One principle pervades the whole book—the desire for an unlimited diffusion of a love of comfort, and even of elegance. There may be, no doubt, very honest differences of opinion as to the propriety of dissemirating a taste for what some will call luxury and false refinement. For our own parts, we believe that a much more wasteful expenditure of the wealth of the community arises out of the low and grovelling habits that belong to tasteless ignorance, than can belong to any pleasure that addresses itself to the mind. The cottager, who has his little flower-garden for recreation; whose health, and that of his family, is preserved by being in a dry, warm, and well-ventilated house; who has conveniencies for

the most economical cookery; who has accustomed himself to the pleasures of a cleanly fireside; who wishes for neatness, and even something of elegance in his furniture; and who has acquired a love for reading, that man is likely to prove a much more efficient contributor to the wealth of society by his own exertions, and to hold himself much farther above the degradation of living upon the common stock, than he who rushes from a damp and dirty house, and a cheerless hearth, to partake the nightly stimulants of the noisy ale-house. We conclude with a passage from Mr. Loudon's book, which appears to us as correct in thought as forcible in expression:—

"All that is essential, in point of the general arrangement of a house, may be obtained in a cottage with mud walls, as well as in a palace built with marble; and we intend now to point out in what manner all that is comfortable, convenient, agreeable, and much of even what is elegant in modern furniture and furnishing, may be formed of the indigenous woods and other common articles of every country, as well as of the most beautiful exotic timbers, and other costly materials obtained from abroad. If it should be asked, whether we expect that such designs as those which follow can be executed or procured by the cottagers of this country, we answer, that we trust they soon will be; and we believe that the first step towards this desirable end is to teach them what to wish for. As the spread of knowledge becomes general, it will be accompanied by the spread of taste; and correct habits of thinking will go hand-in-hand with comfortable dwellings, and convenient, neat, and elegant forms of furniture. An approximation to equalization in knowledge will lead to an approximation in everything else; for knowledge is power, and the first use that every man makes of it is to better his condition. Our grand object, therefore, in this, as in every other department of our work, is to cooperate with the causes at present in operation, for bettering the condition, and elevating the character, of the great mass of society in all countries. Though most of the designs submitted are of a superior description to what are common in cottages, they are not, on that account, more expensive than various cumbrous articles of furniture now possessed or desired by every cottager in tolerable circumstances. The difference will be found to consist chiefly in the kind of labour employed in making them, and in the style of design which they exhibit."

STATUE OF SIR JOSEPH BANKS,

IN THE BRITISH MUSEUM.

"POSTERITY is likely to do scanty justice to the merits of Banks, when the grateful recollections of his contemporaries shall have passed away. His name is connected with no great discovery, no striking improvement; and he has left no literary works from which the extent of his industry or the amount of his knowledge can be estimated. Yet he did much for the cause of science,—much by his personal exertions,—more by a judicious and liberal use of the advantages of fortune. For more than half a century a zealous and successful student of natural history in general, and particularly of botany, the history of his scientific life is to be found in the records of science during that long and active period."

The above remarks are extracted from a memoir of Sir Joseph Banks in the "Gallery of Portraits;" and they point out the propriety of erecting some public monument to the memory of this friend of science before "the grateful recollections of his contemporaries shall have passed away." That duty has been accomplished: a beautiful marble statue has been executed by subscription, and presented by the subscribers to the British Museum. It is placed in the hall of that institution. The likeness is admirable; and the calm repose and dignified simplicity of the figure, class this statue amongst the happiest efforts of our eminent sculptor, Mr. Chantrey. A further memorial of Banks has also been associated with this monument. A fine drawing, by Mr. Corbould, of the statue, has been engraved in mezzotinto by Mr. Cousins; and a copy of this exquisite engraving has been presented to each subscriber. One hundred impressions, moreover, have been taken for public sale, for the benefit of the Artists' Fund, and may be had of Messrs. Colnaghi and Son. We are indebted to the committee for erecting this statue, for a reduced drawing by Mr. Corbould.



[Statue of Sir Joseph Banks.]

PUBLIC WALKS AND PLACES OF EXERCISE.

SHAKSPEARE, in the play of "Julius Cæsar," when Marc Antony is addressing the plebeians of Rome, and urging them to revenge the death of the great dictator, with consummate knowledge of the feelings of the bulk of the people, puts this last and most powerful appeal into the mouth of the orator:—

"Moreover, he hath left you all his walks,
His private arbours, and new-planted orchards,
On this side Tiber; he hath left them you,
And to your heirs for ever, common pleasures,
To walk abroad and recreate yourselves."

Undoubtedly, one of the greatest benefits that can be conferred upon the inhabitants of a crowded city, is to provide for them spacious and accessible spots, where the young may indulge in those exercises which to them are the greatest of pleasures, and the adult "may walk abroad and recreate" themselves. In the time of Shakspeare, the people of London, and of the large cities of England in general, had, to a much greater extent than at present, the means of such enjoyments. Almost every town had its butts or archery ground; and the laws for preventing trespasses were much less rigidly enforced than they are now, when the value of property in the immediate vicinity of any crowded population is so materially increased. That this gradual diminution of one of the chief sources of healthful and innocent enjoyment has been productive of most serious injury to the physical and moral condition of the community, there can be no question. The evil, however, has been inquired into by the House of Commons, and will probably be materially remedied. Although it is no part of our ordinary duty to allude to the proceedings of Parliament, we have much pleasure in making our readers acquainted with the Report, dated the 27th June last, of the "Select Committee appointed to consider the best means of securing open spaces in the vicinity of populous towns, as public walks and places of exercise, calculated to promote the health and comfort of the inhabitants."

The committee, which was appointed by the House of Commons on the 21st of February, examined witnesses from London, Bristol, Birmingham, Walsall, Hull,

Liverpool, Leeds, Bradford, Blackburn, Bolton, Bury (Lancashire), Manchester, and Sheffield. In their report they have embodied the substance of the information communicated by these witnesses. In the seats of the three great manufactures of the kingdom, cotton, woollen, and hardware, they find, that while the wealth, importance, and population of the towns have increased in the most surprising manner, no provision has been made to afford the people the means of healthy exercise or cheerful amusement with their families, on their holidays or days of rest. The evidence, above all, shows that during the hour or half-hour after work, the artisans and their children, in most places, cannot obtain a sight of the fair face of nature—they cannot look upon a field or a green tree—without encountering a very long walk through muddy or dirty roads. This evil, and its consequences, are well described, in a letter to the chairman of the committee, by Dr. Kay of Manchester:—

"At present the entire labouring population of Manchester is without any season of recreation, and is ignorant of all amusements, excepting that very small portion which frequents the theatre. Healthful exercise in the open air is seldom or never taken by the artisans of this town, and their health certainly suffers considerably from this deprivation. The reason of this state of the people is, that all scenes of interest are remote from the town, and that the walks which can be enjoyed by the poor are chiefly the turnpike-roads, alternately dusty or muddy. Were parks provided, recreation would be taken with avidity, and one of the first results would be a better use of the Sunday, and a substitution of innocent amusements at all other times, for the debasing pleasures now in vogue."

The metropolis is in some respects better provided with the means of affording air and exercise to its enormous population; but these have been very much curtailed of late years in particular districts. The population of London, including the suburbs, is now a million and a half. Let us follow the committee in their statements of what advantages this great mass of human beings possess for the preservation of their health, and the promotion of enjoyment, by exercise in open spaces.

In taking a view of that part of London which is situate to the north of the Thames, the committee begin near Vauxhall Bridge, and follow the margin of this vast city round till it again meets the Thames near the West India Docks. St. James's Park, the Green Park, and Hyde Park, afford to the inhabitants of all this western portion of the metropolis inestimable advantages as public walks. The two latter parks are open to all classes. St. James's Park has lately been planted and improved with great taste, and the interior is now opened, as well as Kensington Gardens, to all persons well behaved and properly dressed.

From Hyde Park, following the edge of the town to the north-east, the committee find no open public walk till they reach the Regent's Park to the north of the New Road. This park is a most inestimable advantage to all those who reside near it; but the committee express their hope, that no mistaken regard for a small rent to be derived from the pasturage, will prevent a larger portion of this park being soon thrown open to the public under proper regulations. The committee add, that they have heard, with much regret, that it is in contemplation to inclose and build upon that pleasant rising ground called Primrose Hill. No one, they say, who has seen the throng resorting thither in the summer months, and the happiness they seem to enjoy, but must lament that this spot, commanding a fine view and good air, should be taken from them; and they suggest that means should be taken by Government to secure it in its present state.

For several miles along the northern edge of the metropolis, all the way to the river at Limehouse, there is not a single place reserved as a park or public walk, planted and laid out for the accommodation of the people; yet there is no part of London where such improvements are more imperatively called for. Three places along the north-eastern border of London have been suggested as proper for public walks. The first is an open space of nearly fifty acres, called Copenhagen Fields, in a high and healthy situation, which is to be disposed of. The second place is Hackney Downs or Bonner's Fields, on a dry and gravelly soil, which would form public walks of great advantage to the neighbourhood. The third is an extension and improvement of the embankment along the river-side, to the east of London, from Limehouse to Blackwall, called the Mill Wall. This place, if laid out as a public terrace or walk, would command a view of the opposite coast of Kent, and all the vessels passing up and down the river, to the port of London.

On the south bank of the Thames, from Vauxhall Bridge to the east end of Rotherhithe, there is no single spot reserved as a park or public walk for the accommodation of the inhabitants. Kennington Common, about seventeen acres, is indeed kept uninclosed, and has across it a public thoroughfare; though this Common might be improved, its advantages are very limited. The committee, therefore, recommend to the consideration of the House the peculiar natural advantages which the metropolis might possess in respect to public walks on the banks of the Thames. They point out several improvements that might be easily made above Westminster Bridge; and recommend the admission of the public to the Terrace on the river front of Somerset House. They also propose that Government should compound with the proprietors of Waterloo Bridge for the removal of the toll-gate next the Strand, so that the bridge might be open as a public walk.

The committee next proceed to recommend the establishment of places for athletic exercises in the vicinity of large towns. They very properly say, "the spring to industry which occasional relaxation gives, seems quite as necessary to the poor as to the rich." They also particularly advocate the formation of bathing-places.

It must be quite evident that it will be a work of time to carry into effect these recommendations; and, therefore, the committee in the first instance do little more than press the subject on the serious attention of the House. They hope that "the time is arrived when an earnest and growing interest in all that relates to the welfare of the humble classes is taking possession of the public mind." In such a feeling every large amelioration of our social condition must begin. Most anxiously, therefore, do we trust that persons of wealth and influence will unite to carry into effect the recommendations of this committee—each according to his opportunities—in the full conviction that the happiness of all classes of the community is most intimately linked together. If any arguments were wanting for such exertions, they might be found in the following passage of the report before us:—

"It cannot be necessary to point out how requisite some public walks or open spaces in the neighbourhood of large towns must be, to those who consider the occupations of the working classes who dwell there, confined as they are during the week-days as mechanics and manufacturers, and often shut up in heated factories. It must be evident that it is of the first importance to their health on their day of rest to enjoy the fresh air, and to be able (exempt from the dust and dirt of public thoroughfares) to walk out in decent comfort with their families. If deprived of any such resource, it is probable that their only escape from the narrow courts and alleys (in which so many of the humble classes reside) will be those drinking-shops, where, in short-lived excitement, they may forget their toil, but where they waste the means of their families, and too often destroy their health. Neither would your committee forget to notice the advantages which the public walks (properly regulated and open to the middle and humbler classes) give to the improvement in the cleanliness, neatness, and personal appearance of

those who frequent them. A man, walking out with his family among his neighbours of different ranks, will naturally be desirous to be properly clothed, and that his wife and children should be so also; but this desire, duly directed and controlled, is found by experience to be of the most powerful effect in promoting civilization, and exciting industry; and your committee venture to remark that it is confined to no age, or station, or sex. Few persons can fail to have remarked the difference usually observant in the general character and conduct of those among the working classes who are careful of personal neatness, as contrasted with the habits of others who are negligent or indifferent on this point. It is by inducement alone that active, persevering, and willing industry is promoted; and what inducement can be more powerful to any one, than the desire of improving the condition and comfort of his family."

FIRE OF LONDON.

The 2d of September (old style) is the anniversary of the breaking out of the most memorable conflagration on record—the great Fire of London in 1666. Many contemporary narratives of this event have been preserved, the ample details afforded by which might furnish a considerable volume; but we shall endeavour to compress within a moderate space a summary of the most remarkable particulars attending the commencement and progress of the desolating visitation.

In the course of the preceding year, London had been nearly half depopulated by the most destructive plague that had ever been known in England. The disease, which made its appearance about the beginning of May, continued its ravages till the end of September; and during that period above 68,000 individuals were enumerated as having been carried off by it, in the Bills of Mortality. But the real number of victims in that district, it is probable, did not fall much short of 100,000. The spirits of the people were but beginning to recover from this calamity, and the town, in which the grass had been seen growing in the principal streets, had scarcely resumed its wonted appearance, when the scene of universal consternation was suddenly renewed by the terrific event we are now about to notice.

Although the greatest obscurity hangs over the origin of the fire, all the accounts agree in stating that it commenced in a house in Pudding Lane, on the east side of new Fish Street Hill, ten doors from Thames Street, which was occupied by the King's baker, a person of the name of Farryner. It appears to have broken out, not as Evelyn in his "Diary" states, at ten o'clock at night, but rather about one in the morning of Sunday, the 2d of September, the time mentioned in the account published by authority in the "London Gazette." No more full or graphic description has been given of the first appearance of the conflagration than that which we find in the "Diary" of Pepys, then clerk of the Acts of the Navy,—a portion of which we shall therefore give.

"Some of our maids sitting up late last night to get things ready against our feast to-day, Jane called us up about three in the morning, to tell us of a great fire they saw in the city. So I rose and slipped on my night-gown and went to her window; and thought it to be on the back side of Mark Lane at the farthest; but being unused to such fires as followed, I thought it far enough off*; and so went to bed again and to sleep. About seven rose again to dress myself, and there looked out at the window, and saw the fire not so much as it was, and further off. So to my closet to set things to rights, after yesterday's cleaning. By and by Jane comes, and tells me that she hears that above three hundred houses have been burned down to-night by the fire we saw, and that it is now burning down all Fish Street, by London Bridge. So I made myself ready presently, and walked to the Tower, and there got up upon one of the high places, Sir J. Robinson's little son going up with me; and there I did see the houses at that end of the bridge all on fire, and an infinite great fire on this and the other side the end of the bridge. . . . So I drove to the water-side, and there got a boat, and through bridge, and there saw a lamentable fire. . . . Every body endeavouring to remove their goods, and flinging into the river, or bringing them into lighters that lay off; poor people staying in their houses as long as till the very fire touched them, and then running into boats, or clambering from one pair of stairs by the water-side to another. And among other things the poor pigeons, I perceive, were loth to leave their houses, but hovered about the windows and balconies, till they burned their wings and fell down."

In the evening Pepys, accompanied with his wife and some friends, took boat near Whitehall, "and thence," he continues, "to the fire, up and down, it still encreasing, and the wind great. So near the fire as we could for smoke; and all over the Thames, with one's faces in the wind, you were almost burned with a shower of fire-drops. This is very true; so as houses were burned by these drops and flakes of fire, three or four, nay five or six houses, one from another. When we could endure no more upon the water, we to a little alehouse on the Bankside, over against the Three Cranes, and there staid till it was dark almost, and saw the fire grow, and as it grew darker, appeared more and more, and in corners, and upon steeples, and between churches and houses, as far as we could see up the hill of the City, in a most horrid malicious bloody flame, not like the fine flame of an ordinary fire. . . We staid till it being darkish, we saw the fire as only one entire arch of fire from this to the other side the bridge, and in a bow up the hill for an arch of above a mile long: it made me weep to see it. The churches, houses, and all on fire, and flaming at once; and a horrid noise the flames made, and the cracking of houses at their ruin."

In what was long received as the most correct account of the fire, as well as of the plague which preceded it,—the tract entitled "God's Terrible Voice in the City," by the Rev. T. Vincent, minister of St. Magdalen, Milk Street,—it is stated that on the Sunday the destructive element had run as far as Garlick Hythe in Thames Street, and had crept up into Cannon Street, and had levelled it with the ground. A violent east north-east wind had been blowing with scarcely any intermission for above a week before, and was still as high as ever. This drove the flames up the bank of the river and into the heart of the City. The progress which they made towards the east was comparatively slow.

Early on Monday the whole of Gracechurch Street was on fire, as well as Lombard Street to the west, and part of Fenchurch Street, to the east of it. The flames then seized upon Cornhill, enveloping the Royal Exchange, as well as all the other buildings in the street. Evelyn went on the afternoon of this day to the Bankside in Southwark, to see the conflagration. "It was," he says, "so universal, and the people so astonished, that from the beginning, I know not by what despondency or fate, they hardly stirred to quench it, so that there was nothing heard or seen but crying out and lamentations, running about like distracted creatures, without at all attempting to save even their goods. . . Here we saw the Thames covered with goods floating, all the barges and boats laden with what some had time and courage to save; as on the other, the carts, &c., carrying out to the fields, which for many miles were strewed with moveables of all sorts, and tents erecting to shelter both people and what goods they could get away. . . All the sky was of a fiery aspect like the top of a burning oven, and the light seen above forty miles round about for many nights. God grant mine eyes may never behold the like, who now see

* Pepys' house and office were in Seething Lane, Crutched Friars.

above ten thousand houses all in one flame! The noise, and cracking and thunder of the impetuous flames,—the shrieking of women and children,—the hurry of people,—the fall of towers, houses, and churches was like a hideous storm, and the air all about so hot and inflamed that at last one was not able to approach it, so that they were forced to stand still and let the flames burn on, which they did for near two miles in length and one in breadth. The clouds, also, of smoke were dismal, and reached, upon computation, near fifty miles in length."

This day it appears that some houses were pulled down in Whitefriars, and it was proposed to pull down all those on each side of the river Fleet, from the Thames to Holborn Bridge. Vincent mentions, that such was already the difficulty of procuring conveyances for goods, that £5, £10, £20, and even £30, were, in some instances, given for a cart to carry valuable articles out into the fields. In the course of Monday night, the fire, besides having made some way even in the face of the wind along Thames Street and Fenchurch Street eastward, rushed onwards from Cornhill to Cheapside, the greater part of which, as well as of the streets between it and the river, and many also of those to the north, it had laid in ashes before day-break. A writer, who was in town by seven o'clock on Tuesday morning, and whose account has been published by Mr. Malcolm in his 'Londinium Redivivum,' from the MS. which was in the possession of Mr. Gough, says, "It came to St. Paul's about noon, and thrusting forwards with much eagerness towards Ludgate, within two hours more drove those from the work, who had been employed all that day in levelling the houses on the river Fleet. It rushed like a torrent down Ludgate Hill, and by five o'clock was advanced as high as Fleet Conduit. Despairing then of ever seeing this place more but in ashes, we went to Hornsey, four miles off, and in our way to Highgate, we might discern with what rage and greediness it marched up Fleet Street."

The night of Tuesday is stated to have been even more dreadful than that of Monday; the fire making its way with prodigious and irresistible rapidity to the west, while the immense field of its previous devastations still continued to flame behind.

In the course of this night, however, the wind began to slacken a little; and, according to the account already referred to, published by Malcolm, the fire was stopped at the Temple, Fetter Lane, and Holborn Bridge, between the hours of two and six on Wednesday morning. In Shoe Lane, however, it was not mastered till twelve; and in Cripplegate and the neighbourhood it burned till evening. Its extinction at the different points where it was stopped was effected principally by the expedient of blowing up the houses in its way with gunpowder. A barrel of powder was put under each house, which is stated to have first lifted up the whole a yard or two, after which it fell down on its site in a mass of ruins. There was soon found to be little or no danger to the bystanders in this operation.

But, although, in the course of Wednesday the fire was thus got under in all parts, the condition of the inhabitants of the destroyed city was, as may be conceived, dismal in the extreme. It was only now that the full extent of the calamity came to be seen and felt. Not more than six or seven individuals had fallen a prey to the flames, although it is probable that the sudden removal from their houses into the open fields must have been fatal to many of the sick and aged. But although life was left to the houseless multitude, they had lost almost everything else. Evelyn draws a melancholy picture of the general desolation. "The poor inhabitants," he says, "were dispersed about St. George's Fields, and Moorfields, as far as Highgate, and several miles in circle, some under tents, some under miserable huts and hovels; many without a rag, or any necessary utensils, bed, or board, who from delicateness, riches, and easy accommodations, in stately and well-furnished houses, were now reduced to extremest misery and poverty. . . . The people who now walked about the ruins appeared like men in some dismal desert, or rather in some great city laid waste by a cruel enemy; to which was added the stench that came from some poor creatures' bodies, beds, and other combustible goods. . . . Nor was I yet able to pass through any of the narrower streets, but kept the widest; the ground and air, smoke and fiery vapour, continued so intense that my hair was almost singed, and my feet insufferably surbated. The by-lanes and narrower streets were quite filled up with rubbish, nor could one have possibly known where he was, but by the ruins of some church or hall, that had some remarkable tower or pinnacle remaining. I then went towards Islington and Highgate, where one might have seen two hundred thousand people, of all ranks and degrees, dispersed and lying along by their heaps of what they could save from the fire, deploring their loss, and though ready to perish for hunger and destitution, yet not asking one penny for relief, which to me appeared a stranger sight than any I had yet beheld." The misery and confusion, it appears, were still further augmented by a rumour which arose, that the French and Dutch had landed, and were about to enter the city. The mingled terror and fury which this news excited were so great that it became necessary to send bodies of military to the fields where the people were, to watch them and keep down the tumult.

A plan has been engraved, which may be found in Maitland's 'History of London,' exhibiting the extent of the gap made in the metropolis by this dreadful conflagration. It may be described, generally, as reaching from the Tower in the east, to the Temple in the west, while its circuit towards the north might be nearly measured by a semicircle, described from the central point of that portion of the river-side, with a radius of from half a mile to two-thirds of a mile in length. Rather more than three-fourths of the city within the walls were destroyed, together with a space fully equal to the remaining space beyond. The fire, according to Maitland, "laid waste and consumed the buildings on four hundred and thirty-six acres of ground, four hundred streets, lanes, &c., thirteen thousand and two hundred houses, the cathedral church of St. Paul, eighty-six parish churches, six chapels, the magnificent buildings of Guildhall, the Royal Exchange, Custom House, and Blackwell Hall, divers hospitals and libraries, fifty-two of the Companies Halls, and a vast number of other stately edifices, together with three of the city gates, four stone bridges, and the prisons of Newgate, the Fleet, the Poultry, and Wood Street Compters; the loss of which, together with that of merchandise and household furniture, by the best calculation, amounted to ten millions seven hundred and thirty thousand and five hundred pounds."

This great calamity however, as it was felt to be at the time, turned out eventually a blessing to London. The city soon rose again from its ruins, incalculably improved both in convenience and splendour; and the plague, formerly almost its yearly scourge, burned, as it were, out of its ancient places of shelter by the all-cleansing flames, has never since been seen in England.

The fluted Doric column on Fish Street Hill, known by the name of the Monument, which was erected to perpetuate the memory of this great fire, was begun by Sir Christopher Wren in 1671, and finished in 1677. The annexed cut presents a view of it, as it is now laid open by the improvements connected with the new approaches from London Bridge. The Monument is two hundred and two feet in height, and the diameter

of the shaft is fifteen feet. Till lately, an inscription on the Monument imputed the fire to the Papists, then the objects of persecution and popular dislike. It is in allusion to this that Pope has said that this fine column—

"Like a tall bully lifts the head and lies."

It is honourable to the improved feelings of our age, that this calumny upon a great body of our fellow-subjects has been rejected by a vote of the Corporation of London; and that the offensive inscription is now obliterated.



[View of the Monument.]

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CHURCH OF ST. STEPHEN AT VIENNA.



[View of St. Stephen's Church at Vienna.]

THE city of Vienna, the capital of the empire of Austria, is inferior in extent to most of the other European capitals—the circumference of what is properly called the town being only about three English miles. This is the whole that is surrounded by the ancient walls. The suburbs, indeed, which were also walled round in the latter part of the last century, spread to a considerable distance beyond these limits; but of the space which they cover, a very large portion consists merely of gardens and open fields. Although the whole space occupied by the town and the suburbs is about equal in extent to Paris, the population probably does not exceed three hundred thousand, or little more than a third of that of the French capital.

In ancient times, however, its dimensions were much more contracted; for the Cathedral of St. Stephen, which is now nearly in the heart of the city, is stated to have been originally built without the walls. This is one of the most magnificent monuments of Gothic architecture which now exist. It is three hundred and forty feet in length, by two hundred and twenty in breadth, and eighty in height; but its most remarkable feature is its tower terminating in a pyramidical spire, the height of which is said to be four hundred and thirty, or according to other authorities four hundred and sixty, feet. It rises far above everything else in the city. A staircase conducts to the summit, the number of steps in which is seven hundred; and the view from thence over the extensive and richly-cultivated plain in the midst of which Vienna stands, is described as being one of the finest in the world. This lofty and beautiful tower (for the richness of its architecture equals its surprising elevation) rises from the south side of the church. A similar tower on the opposite side of the church is supposed to have been intended in the original design; and the popular tradition is, that after it had been carried as high as the roof of the church, the builder was thrown from a window and killed by the person who had built the former, and who took this way of preventing his own erection from being equalled or surpassed by his rival. A sculpture in marble, which stands under the pulpit, of a man looking out from a window, is pointed to as the record and evidence of this event; but it is more probable that the story has been made for the sculpture than that the sculpture refers to the story.

Even the bitterest enemies both of the Austrian power and of the Christian faith itself have been won to admiration by the beauty of the tower of St. Stephen's. As in ancient times, at the destruction of Thebes,

> "The great Emathian conqueror bid spare
> The house of Pindarus, when temple and tower
> Went to the ground,"

so the Turkish sultan, Soliman II., when he besieged Vienna, in 1529, gave orders that the cannoniers should carefully avoid touching with their shot this noble spire. In acknowledgment of the sultan's generosity, it was ordered that the crescent and star, the Ottoman arms, should be engraved on one of the highest pinnacles; and there, accordingly, they were to be seen till the last siege in 1683, when Kara Mustapha, by whom the bombardment was carried on, not having observed the same forbearance, they were obliterated. It was on this latter occasion, when the Turkish army, consisting of two hundred thousand men, after having continued the attack for twenty-three days, and brought the city to the brink of surrender, was suddenly fallen upon and cut to pieces by a much smaller force under the command of the great John Sobieski, that a bell was cast for the tower of St. Stephen's from the cannon that were captured. The bell contains above eighteen tons of metal, and is ten feet in height, and thirty-two in circumference.

The first church which occupied the site of the present St. Stephen's, was erected by Duke Henry I., in 1144; but after having been twice burnt down, the edifice was entirely rebuilt in 1270. It was originally dedicated to all the saints; and was not made a cathedral till after the middle of the fourteenth century. About the same time it was repaired and greatly enlarged by Rodolphus IV. The tower, however, is of still later date; all that part, at least, which is above the walls having been certainly erected since the year 1400. The Dukes Albert III. and IV. have the credit of commencing and completing it. (See "Vienna Gloriosa," folio. Vienna, 1703.)

The whole of the cathedral, which is built of freestone, is richly decorated, both externally and in its interior, with figures and other ornamental chiselling in the favourite style of the times in which it was erected. The inside is also adorned by between thirty and forty altars, all of marble, among which the high altar is remarkably splendid. To these are to be added numerous monuments or mausoleums. That of the Emperor Frederic III. is said to have cost forty thousand ducats. Another of great sumptuousness is that of the famous Prince Eugene of Savoy. It was only completed in 1759.

ORIGIN OF THE ROYAL ARSENAL AT WOOLWICH

THE Government Foundry for casting brass ordnance was formerly situated in Moorfields. The process of casting the cannon was then an object of curiosity to the inhabitants of the metropolis, many of whom, of all classes, frequently attended during the operation of pouring the melted metal into the moulds. The injured cannon which had been taken from the French in the successful campaigns of the Duke of Marlborough, amounting to a considerable number, had been placed before the foundry and in the adjacent artillery ground, and it was determined, in 1716, to recast these cannon. On the day appointed for performing this work, a more than usual number of persons were assembled to view the process. Many of the nobility and several general officers were present, for whose accommodation temporary galleries had been erected near the furnaces. Among the company then drawn together was Andrew Schalch, an intelligent young man, a native of Schaffhausen in Switzerland, who was travelling for improvement; he was at the foundry at an early hour, and having been permitted minutely to inspect the works, detected some humidity in the moulds, and immediately perceived the danger likely to arise from the pouring into them of hot metal in such a state. Schalch communicated his fears to Colonel Armstrong, the Surveyor General of the Ordnance, explained his reasons for believing that an explosion would take place, and strongly urged him and the rest of the company to withdraw from the foundry before the casting of the metal. The colonel having closely questioned Schalch on the subject, found him perfectly conversant with all the principles of the founder's art, and being convinced of the good sense which dictated his advice quitted the foundry, together with all those persons who could be induced to believe that there were any grounds for apprehension.

The furnaces being opened, the fluid metal rushed into the moulds, the moisture in which was instantly converted into steam, and its expansive force acting upon the metal drove it out in all directions with extreme violence; part of the roof was blown off, the galleries gave way, and a scene of much mischief and distress ensued. Many of the spectators had their limbs broken, most of the workmen were burnt in a dreadful manner, and several lives were lost.

A few days afterwards an advertisement appeared in the newspapers, notifying that if the young foreigner

who foretold this explosion would call at the Ordnance Office it might prove advantageous to both parties. Schalch being informed, through a friend, of this intimation, lost no time in obeying the summons. Colonel Armstrong had then much further conversation with him on the subject; and became by this means so well assured of his superior ability, that it was finally agreed to intrust Schalch with putting into execution the intention of Government to seek an eligible situation out of the metropolis, and within twelve miles thereof, to which the Royal Foundry should be removed. Schalch, after examining different places, at length fixed upon the rabbit warren, at Woolwich, as suitable to his purpose, and the erection of the works was left to his superintendence.

The first specimens of artillery cast by Schalch were so much approved, that he was appointed Master Founder to the Board of Ordnance, and this office he continued to hold during sixty years, assisted in the latter part of that term by his nephew Lewis Gaschlin. Twenty-five years ago, this nephew, then more than eighty years old, was still employed in the Arsenal as principal modeller for the Military Repository. Schalch died in 1776, at the advanced age of ninety, and is buried in Woolwich church-yard. Some of the largest mortars now remaining in the Arsenal were cast under his direction and bear his name.

It is well worthy of remark that the discernment, which did so much honour to Colonel Armstrong, was fully proved by the fact, that during the whole period in which Schalch superintended the casting of the Ordnance at Woolwich, amidst operations attended with much hazard and difficulty, not one single accident occurred; this fact bears ample testimony to the skill, prudence, and watchful care of "the young foreigner," who owed his rise in life to the judicious and prompt application, at a critical moment, of the knowledge he had acquired.

MINERAL KINGDOM.—Section 17.

Organic Remains.—(*Continued.*)

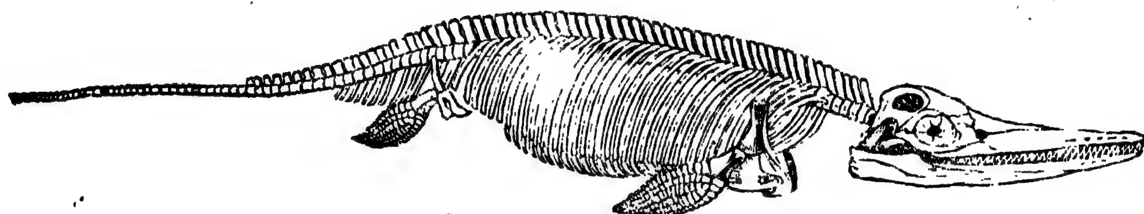
In our last section we gave some examples of remarkable species of fossil-shells, corals and crustacea; two of these, the trilobite and the lily-encrinite, belonging to genera which became extinct after the deposit of the oldest secondary strata. In the extensive series of sand-stones, lime-stones, and clays of the secondary rocks, from the coal measures up to and including the chalk, (see diagram in No. 51, Jan. 19, 1833,—G to M,) the fossil remains of animals consist of a vast variety of shells, corals, sponges, and other marine productions of a similar description,—of a few kinds of crustacea, that is, animals having a crust or shell like that of the lobster or crab, a few kinds of fish, some great reptiles, and a few insects. No remains of land quadrupeds, or of the marine mammalia, (sea-animals which give suck to their young, such as whales,) or of birds, have yet been met with in chalk or any stratum under the chalk, except one instance of the jaw of a small quadruped found by Dr. Buckland in a quarry near Oxford. Among the numerous animal remains that occur in the secondary strata, there is not a single species which has not been for many ages extinct, and even whole genera have totally ceased to exist.

The extinction of species is so important a fact in all that relates to the geological history of the earth, that we will, even at the risk of some repetition, endeavour, by a little popular explanation, to make clear to the general reader what is meant by the term. Each particular kind or *genus* of animal usually consists of several individuals which, while they possess a common character or class of characters, have particular forms which distinguish them from each other, and such individuals constitute the *species* of a *genus*. The characters by which geologists distinguish the relative ages of strata, in so far as animal remains are concerned, depend, not upon the *genus*, but on the *species*; for while species have become extinct, one after the other in succession, the *genera* to which they belong have continued to exist from the period of the deposition of the oldest of the secondary strata to the present time. For example, the *genus* ostrea, or oyster, is found in the lime-stones which lie beneath the coal-measures, but not one of the many *species* of oyster which are met with in almost all the strata, from that lime-stone up to the chalk, is identical with any species of oyster inhabiting our present seas.

It is unnecessary for us to give the names of the marine remains which are most abundant in the secondary strata, because, even with the assistance of figures, they would convey to the general reader no clear idea of their peculiar forms, as distinguished from those of marine shells, corals, sponges, &c., now existing; but some of the marine reptiles are so extraordinary in point of form and size as to deserve a more particular notice. Of these monsters of the ancient seas, nine different genera have already been found entombed in the secondary strata, and of some of the genera there are several species. They have been called *saurians* by geologists, from the resemblance they bear to the lizard tribe, *saura* being the Greek name for a lizard. A common green lizard is a tolerably good miniature representation of the general form of the reptiles we speak of; but a crocodile or alligator gives a still better idea of them. It must be remembered, however, that in speaking of the fossil remains of those animals, we mean only their skeletons or bones: the flesh is never converted into a fossil state. It very seldom happens, also, that the entire skeleton of any large animal is found, particularly in the strata that were deposited at the bottom of a sea, and for this reason: the bones in the living body are kept together by a cartilaginous substance or gristle, which after death putrefies, and then the several members fall asunder. Very often, too, we find only detached bones; and this may be accounted for by another circumstance attending the process of putrefaction. When that commences in a dead animal, a considerable quantity of gas is generated, which swells up the body, and, if that be in water, makes it so much lighter that it floats. In process of time the skin bursts, and the gradually loosened bones are scattered far apart. Such detached bones are frequently all by which we are enabled to decide upon the nature of the animal; and the general reader may, perhaps, think that they are sufficiently scanty materials, considering the important conclusions which geologists sometimes draw from them. But the discoveries of philosophers, who have occupied themselves in comparing the anatomical structure of the lower animals with that of the human frame, and have created the interesting and beautiful department of science called Comparative Anatomy, have enabled them to establish certain fixed and invariable principles for our guidance in this curious branch of geological inquiry. This field of investigation has only been entered upon within a few years; but it has already yielded so rich a harvest, that it has established some of the most important truths connected with the past history of our planet. The great discoverer of those general laws of the animal kingdom was the illustrious French naturalist, the Baron Cuvier, who died last year. He has shewn that there reigns such a harmony throughout all the parts of which the skeleton is composed, so nice an adaptation of the forms to the wants and habits of the animal, and such a degree of mutual subordination between one part and another in portions of the structure apparently quite unconnected, that we are enabled by the inspection of a single bone to say with certainty that it must have belonged to a particular kind of animal, and could not have formed a part of the skeleton of any other. Thus,

if we present to a skilful comparative anatomist a small bone of the foot of a quadruped, he will not only pronounce with certainty as to the size of the animal to which it belonged, but will say what sort of teeth it must have had,—whether it had horns, and whether it fed upon the flesh of other animals or on vegetable substances. If many detached bones belonging to the same kind of animal be collected, the skill of the comparative anatomist enables him to put them together in their true places, and thus a complete skeleton has been constructed of separate fossil bones which had belonged to several individuals of the same species. In this application of anatomy to geology we have a beautiful illustration of the intimate connexion of the sciences with each other. The discovery, in one of our stone-quarries, of a few mutilated fragments of bone imbedded in the solid rock, reveals to us the kind of animals that must have inhabited this region of the earth at the remote period when the rock was in the act of being deposited at the bottom of the sea, and tells us also that the climate was not that of the temperate zone but of the tropics.

The most remarkable of the fossil saurians which are found in the secondary strata are those which have been called ichthyosaurus, plesiosaurus, megalosaurus, and iguanodon. The first of these is so called from the characters of the animal partaking at the same time of the nature of a fish and of the lizard tribe; *ichthys* and *sauros* being two Greek words signifying fish and lizard. Its head resembles that of a crocodile, only it is much larger and sharper, its snout ending in a point, almost as acute as the beak of a bird: it has a most formidable supply of sharp conical teeth, no less than sixty in each jaw. Its head was of an enormous size, for jaws measuring eight feet in length have been found; and it was furnished with a pair of eyes of still more extraordinary proportion, for the oval hollows for that organ in a skull belonging to a gentleman at Bristol measure fourteen and a half inches in their largest diameter, the size of a dish on which a tolerably good-sized turkey could be served up. The head was about a fourth of the whole length of the animal, and was joined to the body by a very short neck: the back-bone was composed of joints or *vertebræ* different from those of land animals, and similar to those of fishes: it was supplied with four paddles like those of a turtle, in the lower part of its body, and by means of these and its very powerful tail it must have darted very swiftly through the water. It was a most singular combination of forms, for it had the snout of a dolphin, the teeth of a crocodile, the head and breast-bone of a lizard, extremities like the marine mammalia, and vertebræ like a fish. We can, however, form no idea of the appearance of the animal when alive, except such as is conveyed to us by the sight of the skeleton; a very imperfect one, no doubt, as we know by the difference between any animal and its skeleton placed beside it. The following representation of the complete skeleton of the ichthyosaurus, as restored in the way we have alluded to, is given by the Reverend W. Conybeare, the eminent geologist to whom we are indebted for the most complete account of these fossil saurians.—(*Transactions of the Geological Society*, vol. i. Second Series.)



[Skeleton to Ichthyosaurus Communis, restored by Mr. Conybeare.]

Remains of the ichthyosaurus have been found in all the secondary strata, between the red sand-stone and the chalk (G to K,—diagram quoted above) in many parts of England; but they are most frequently met with in the lias lime-stone, (I, f,) and in greatest abundance at Lyme Regis in Dorsetshire. They have also been found in several places on the continent, especially in Wurtemberg.

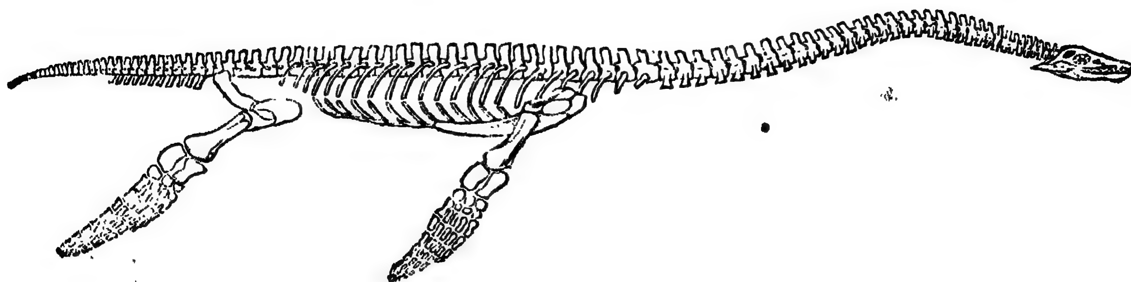
The *plesiosaurus* is so called from its near approach to the lizard tribe, *plesion* being Greek for *near*. It has a considerable resemblance in the body to the ichthyosaurus, but the head is much smaller, and is altogether of a different structure; but its most remarkable character is the great length of its neck. In man, all quadrupeds and other mammalia, there are exactly seven joints or vertebræ in the neck; and so strict is the



[Skeleton of the Plesiosaurus Dolichodeirus, in the position in which it was found at Lyme Regis.]

adherence to this rule, that there is precisely the same number in the short, stiff neck of the whale, and the long, flexible neck of the giraffe. Reptiles have from three to eight joints,—birds many more; the swan, which has the most, is enabled to make the graceful curves of its neck by being provided with twenty-three of those separate vertebræ; but the plesiosaurus had no less than forty-one. In order to convey to our readers an idea of the state in which fossil-bones are found, we have given a representation of a plesiosaurus, found in 1823 at Lyme Regis; but we must remark that, mutilated as it seems, it is rare to find bones lying so nearly in the form of the skeleton as those are. The specimen occurred imbedded in the shale or slaty clay, which lies between the beds of lias limestone, and the skeleton has been crushed almost flat by the vast weight of stone lying above it.

Mr. Conybeare, to whom we are indebted for the first description and name of the plesiosaurus, has given us the following representation of this extraordinary long-necked reptile, in a restored state, in the same way as he has given us a figure of the ichthyosaurus.



[Skeleton of the Plesiosaurus Dolichodeirus, restored by Mr. Conybeare.]

MEGALOSAURUS.—Some fragments of the bones of a saurian of gigantic size were discovered by Dr. Buckland a few years ago in the quarry of Stonesfield, near Woodstock, in Oxfordshire. According to the opinion of Cuvier, who examined them, they must have belonged to an individual of the lizard tribe, measuring forty feet in length, and having a bulk equal to that of an elephant seven feet high. This fossil animal was distinguished by Dr. Buckland with the above name on account of its great size, *megale* being Greek for great.

The other great fossil saurian we have mentioned is the iguanodon which was found in Sussex; but as an account of it has been already given in this "Magazine," (No. 52, Jan. 26, 1833,) we refer our readers to that description.

A most curious discovery was made a few years ago by Dr. Buckland at Lyme Regis.

He had often remarked a number of long rounded stony bodies, like oblong pebbles or kidney potatoes scattered on the shore, and frequently lying beside the bones of the saurians when these were discovered in the rock. He was induced to make a closer examination of them, and they turned out to be the *dung* of the saurian reptiles in a fossil state. When found along with the bones they are always under or among the ribs. Many specimens of them contained scales, teeth, and bones of fishes that seem to have passed undigested through the body of the animals; just as the enamel of teeth and fragments of bone are found undigested in the dung of the ravenous hyæna. It was thus shown that these great monsters of the deep fed not only on their weaker neighbours, but sometimes even on the smaller defenceless individuals of their own species; for Dr. Buckland found in one of these stones a joint of the back-bone of an ichthyosaurus that must have been at least four feet in length. He has called the stones *coprolites*, from *kopros*, Greek for dung, and *lithos*, a stone. Since his attention was directed to the subject, he has found similar bodies in many other strata, and belonging to different animals. "In all these various formations," he says, "the coprolites form records of warfare waged by successive generations of inhabitants of our planet on one another; and the general law of nature, which bids all to eat and to be eaten in their turn, is shown to have been co-extensive with animal existence upon our globe, the *carnivora* in each period of the world's history fulfilling their destined office to check excess in the progress of life, and maintain the balance of creation."

Before proceeding to speak of the more remarkable forms of organic life preserved in the tertiary strata, or those which lie superior to the chalk, we shall, in our next section, give a brief account of the *Fossil Flora* of the older sedimentary deposits of those remains of the vegetable kingdom which are found throughout the whole of the secondary strata, and, in some of them, in vast accumulations.

OLD TRAVELLERS.—MARCO POLO.—
(*Conclusion.*)

The dramatic scenes and adventures of our old traveller's life were not destined to end with his return to Venice. On the arrival of the Poli there, they found that their fellow-citizens had long numbered them with the dead; and their mansion was in the occupation of some distant relations, who were long before they could recognize, after so many years' absence, the returned travellers as members of the Polo family. To make themselves known to their forgetful relations, and at the same time to impress all Venice with a proper notion of their identity, wealth and importance, the Poli gave a magnificent entertainment in their own house. When the numerous guests were assembled, the three travellers entered, clothed in long robes of crimson satin. When water had been carried round for the washing of hands, and the guests shown to their seats, they changed these costly vestments for similar ones of crimson damask; these again they changed after the first course had been removed, for robes of crimson velvet; and at the conclusion of the banquet they doffed their velvet, and appeared in such plain suits as were worn by the gentlemen of Venice. The robes of satin, of damask, and of velvet, were taken to pieces and their materials distributed among the attendants. Then, when the dinner-table had been uncovered, and the domestics ordered to retire, Marco proceeded to an inner apartment, and presently returned with the three coarse thread-bare garments in which they were clad when they first sought admittance into their own house. They ripped open the seams, linings, and patches of these humble dresses, and brought to view such a quantity of diamonds and other precious stones as dazzled both the eyes and the imagination of the beholders. At the display of such incalculable wealth the company was at once convinced that these were indeed "the honourable and valiant gentlemen of the house of Polo,"—all doubts vanished, and the hosts were treated with profound respect.

Not many months of tranquillity had, however, elapsed, when an hostile Genoese fleet, commanded by Lampa Doria, threatened some of the Venetian possessions on the opposite coast of Dalmatia. The galleys at Venice immediately put to sea under the orders of Andrea Dandolo; and the adventurous Marco, as a patriotic citizen, and an experienced seaman, took the command of one of them. The fleets soon met: Marco foremost of the advanced division, gallantly threw himself among the enemy; but he was not properly supported by his countrymen, and after receiving a wound, was obliged to surrender to the Genoese. The Venetians were defeated with great loss, and besides Marco Polo, Andrea Dandolo their admiral was among the number of prisoners taken by Doria.

From the Dalmatian coast Marco was carried to a prison in Genoa; but his fame had probably preceded him thither, and, as soon as he was personally known, he received every possible respect and attention, having all his wants liberally supplied, and the place of his detention, instead of a solitary and wearisome confinement, being daily crowded by the gentlemen of Genoa, who were as curious as those of Venice. Here, tired, as it is said, by being obliged so frequently to repeat the same stories, he first determined to follow the advice of those who urgently recommended him to commit his travels and adventures to writing. Accordingly he procured from his father at Venice all the notes he (Marco) had made on his different journeys. From those original documents, and from verbal additions to them, Rustighello or Rustigielo, a gentleman in the Venetian service, who was in the daily habit of passing many hours with him, drew up the narrative in Marco's prison. The manuscript is supposed to have been finished and circulated in the year 1298.

Marco's captivity deeply afflicted his father and uncle, whose fondest hopes were to see him suitably married at Venice, and become the father of sons who should continue the name and inherit the wealth they had accumulated. They petitioned and offered large sums of money to the Genoese for his liberation, in vain. It was not till after a lapse of four years, in consequence of the exertions in his favour of the noblemen and indeed of the whole city of Genoa, that Marco obtained his liberty and returned to Venice. He then married, and had two daughters.

When Nicolo died full of years and honours, his pious and affectionate son erected a stately monument to his memory "under the Portico in front of the church of St. Lorenzo, upon the right-hand side as you enter.*" Ramusio, who wrote about the middle of the sixteenth century, says that this monument was still to be seen there. When Marco himself was gathered to his fathers cannot be precisely ascertained, but his "last will and testament" bears the date of 1323; and he probably died shortly after, at the good age of seventy years. According to Sansovino, Marco also had a tomb under the portico of the church of St. Lorenzo. At present neither the tomb of Nicolo nor that of Marco can be found in Venice.

People did not wait for the death of Marco Polo to question his veracity, and to treat the narrative of his travels with ridicule. Even in his native city, and not long after his return, he was nicknamed "Marco Milione," (Mark Million †,) from his frequent use of that high numerical term in speaking of the immense population and the revenues of the Tartar-Chinese empire. It is also reported that when he lay on his deathbed, some of his scrupulous friends entreated him, as a matter of conscience, to retract such of his statements as appeared to them fictitious; and it is added that the old traveller indignantly rejected their advice, protesting that, instead of exceeding the truth, he had not told half of the extraordinary things he had seen with his own eyes. But after his death he was treated with still greater disrespect by an ignorant populace. In the masquerades during the Carnival the Venetians always had for one character a "Marco Milione," and this buffoon amused the mob by telling whatever extravagant tale came into his head. When Marco wrote, Italy was far from having recovered from the losses she sustained at the dissolution of the Roman empire; her population, moreover, was divided into a number of paltry states;—the very recollection of what had been the extent of the empire of which they once formed part seems to have been forgotten, and people turned with doubt from the traveller's account of the hundreds of cities, and millions of inhabitants, in China. The exaggerations of fear and hatred had represented the Tartar tribes that had overrun a good part of the western as well as the eastern world as little superior to wild beasts: how then could they believe that this very race, in Tartary and China, were highly civilized, living under a regular government, having magnificent cities, manufactures, and a commerce compared to which that of Venice (then the most considerable in Europe) sank into utter insignificance?

Marco Polo had also the misfortune to write long before the use of printing; and during a century or more, the manuscript copies made of his work were liable to all the errors of careless and ignorant transcribers. He was afterwards translated into different European languages by those who were evidently ill acquainted with the idiom in which his Travels were written*, and lamentably ignorant of geography and the physical sciences. These translations were again translated and errors heaped upon errors. Thus, in English, Hakluyt, who was one of our earliest collectors of travels, gave an account of Marco Polo's from an incorrect Latin version he had somewhere picked up; "and here," as Purchas says, "the corrupt Latin could not but yield a corruption of truth in English."

At last, in 1559, more than two centuries after Marco's death, something approaching to justice was done him by his countryman Ramusio, who published a corrected Italian version of his narrative, in the second volume of his Collection of Travels. Purchas used this translation, and made Marco Polo more popular in England†. Robertson, Gibbon, and Vincent, also preferred Ramusio to all other editors and translators. Numerous other editions and translations continued to be made in different parts of Europe; but it was not till 1818 that full justice was done to Marco Polo, by our countryman Mr. William Marsden, whose book (then first published) is altogether one of the most remarkable that have been produced in our days‡. This volume contains the results of many years of labour devoted to the task of validating the authority of the old traveller; and from the mass of evidence thus collected, has established beyond a doubt that the long-calumniated Venetian is most remarkably correct whenever "*si dice*," or "it is said," is not introduced. When these words occur, Marco is only telling what was told to him, and must, as we have before said, be listened to with reservation. By this remarkable volume (to use a favourite oriental idiom) the face of Marco Polo has been whitened.

* Ramusio. The church of San Lorenzo stood on one of the islets of Venice called "I Gemelli" or "The Twins."

† When Ramusio wrote, the house at Venice where Marco had lived was still called "*La Corte del Milione.*"

* This appears to have been the Venetian dialect, which was very different then, as it is now, from the Tuscan, or literary language of Italy.

† Purchas published his Collection of Travels in the beginning of the seventeenth century.

‡ "The Travels of Marco Polo, a Venetian, in the thirteenth century: being a Description, by that Early Traveller, of Remarkable Places and Things in the Eastern Parts of the World. Translated from the Italian, with Notes, by William Marsden, F.R.S., &c. London, 1818."

FATA MORGANA, IN THE BAY OF REGGIO.

Reggio is a considerable town in Calabria, most beautifully situated on the Faro, or Strait, of Messina, which separates Italy from the island of Sicily, and has at that point the appearance of a majestic river. The neighbourhood is rich in choice and most varied productions; continuous groves of orange, lemon, and citron trees extend for several miles on either side the town, which is backed by a grand range of mountains, whence descend numerous rivulets that refresh and fertilize the soil. The Sicilian shores, with the fair city of Messina and numerous white villages, and mountains of the most picturesque forms in the distance, face this terminating point of Calabria. The dark-blue sea, which flows through the narrow channel with a rapid current, purifies the air and causes a gentle refreshing breeze that rarely fails, and is felt most deliciously during the summer heats.

"Do you know," says Brydone to his correspondent, "that the most extraordinary phenomenon in the world is often observed near to this place? * * * It has often been remarked, both by ancients and moderns, that in the heat of summer, and after the sea and air have been greatly agitated by winds, and a perfect calm succeeds, there appears about the time of dawn, in that part of the heavens over the straits, a vast variety of singular forms, some at rest, and some moving about with great velocity. These forms, in proportion as the light increases, seem to become more aërial; till at last, some time before sunrise, they entirely disappear*."

The phenomenon which the traveller here rather incorrectly describes, is called the Fata Morgana, or the Fairy Morgana; a name not altogether inappropriate, when we consider the magical, fairy-like effects produced. After saying that the philosophers of the country were puzzled to account for the causes of these effects, Brydone continues, "Some of them think they may be owing to some uncommon refraction or reflection of the rays from the water of the straits; which, as it is at that time carried about in a variety of eddies and vortexes, must of consequence, say they, make a variety of appearances on any medium where it is reflected." From this reasoning, which is not very satisfactory, the traveller dissents, and proposes a theory of his own. He thinks the phenomenon somewhat of the nature of the aurora borealis, and dependent on electric causes. "Electrical vapour," says he, "in this country of volcanoes is produced in much greater quantities than elsewhere. The air being strongly impregnated with this matter, and confined between two ridges of mountains, at the same time exceedingly agitated from below by the violence of the current and impetuous whirling of the waters, may it not be supposed to produce a variety of appearances?" This mode of accounting for the phenomenon is very vague; nor are Mazzi, Angelucci, and other native writers, much clearer. They say that to produce the effect a dead calm is necessary; that the motion of the current in the straits must cease, and the waters rise above their ordinary level; that this must take place at a time of the day when all the objects on the shore are reflected in colossal forms in the sea; that then the undulating changes of this marine mirror, cut into facets, repeat in a thousand different shapes all those images; and if the air be at the same time charged with electric matter, these multiplied objects are reflected in the air also.

A more scientific explanation was attempted in 1773 by Antonio Minasi, a Dominican friar, who informs his readers that he *saw* the phenomenon three several times, and so beautiful was it, that he would rather behold it again than the most superb theatrical exhibition in the world. The friar says, "When the rising sun shines from that point whence its incident ray forms an angle of about 45° on the sea of Reggio, and the bright surface of the water in the bay is not disturbed either by the wind or the current, the spectator being placed on an eminence of the city, with his back to the sun and his face to the sea—on a sudden he sees appear in the water, as in a catoptric theatre, various multiplied objects, *i. e.* numberless series of pilasters, arches, castles well delineated, regular columns, lofty towers, superb palaces with balconies and windows, extended alleys of trees, delightful plains with herds and flocks, &c., all in their natural colours and proper action, and passing rapidly in succession along the surface of the sea, during the whole short period of time that the above-mentioned causes remain. But if, in addition to the circumstances before described, the atmosphere be highly impregnated with vapour and exhalations not dispersed by the wind nor rarefied by the sun, it then happens that in this vapour, as in a curtain extended along the channel to the height of about thirty palms and nearly down to the sea, the observer will behold the scene of the same objects not only reflected from the surface of the sea, but likewise in the air, though not in so distinct and defined a manner as in the sea. And again, if the air be slightly hazy and opaque, and at the same time dewy and adapted to form the iris, then the objects will appear only at the surface of the sea, but they will be all vividly coloured or fringed with red, green, blue, and the other prismatic colours."

The singular effect last alluded to will be comprehended by a glance at our cut; and the reader will perceive, that as the rigging of the ship there is surrounded by the fringe, the beautiful rainbow colours attach to direct rays from objects as well as to the reflections of objects. When this phenomenon, which is of rare occurrence, makes its appearance, the people hail it with exultation and joy, running down to the sea side, clapping their hands and exclaiming, "Morgana! Morgana! Fata Morgana!" The Dominican, in his explanation, says, the sea in the Strait of Messina has the appearance of a large inclined speculum; that in the alternate current which flows and returns in the channel for six hours each way, and is constantly attended by an opposite current along shore to the medium distance of about a mile and a half, there are many eddies and irregularities, especially at the time of its change of direction; and that the Fata Morgana usually appears at *this* period. He then shows what must be the relative position of the sun and moon, necessary to afford high water at the proper time after sunrise, to meet the other peculiar circumstances necessary for the formation of the beautiful and evanescent vision.

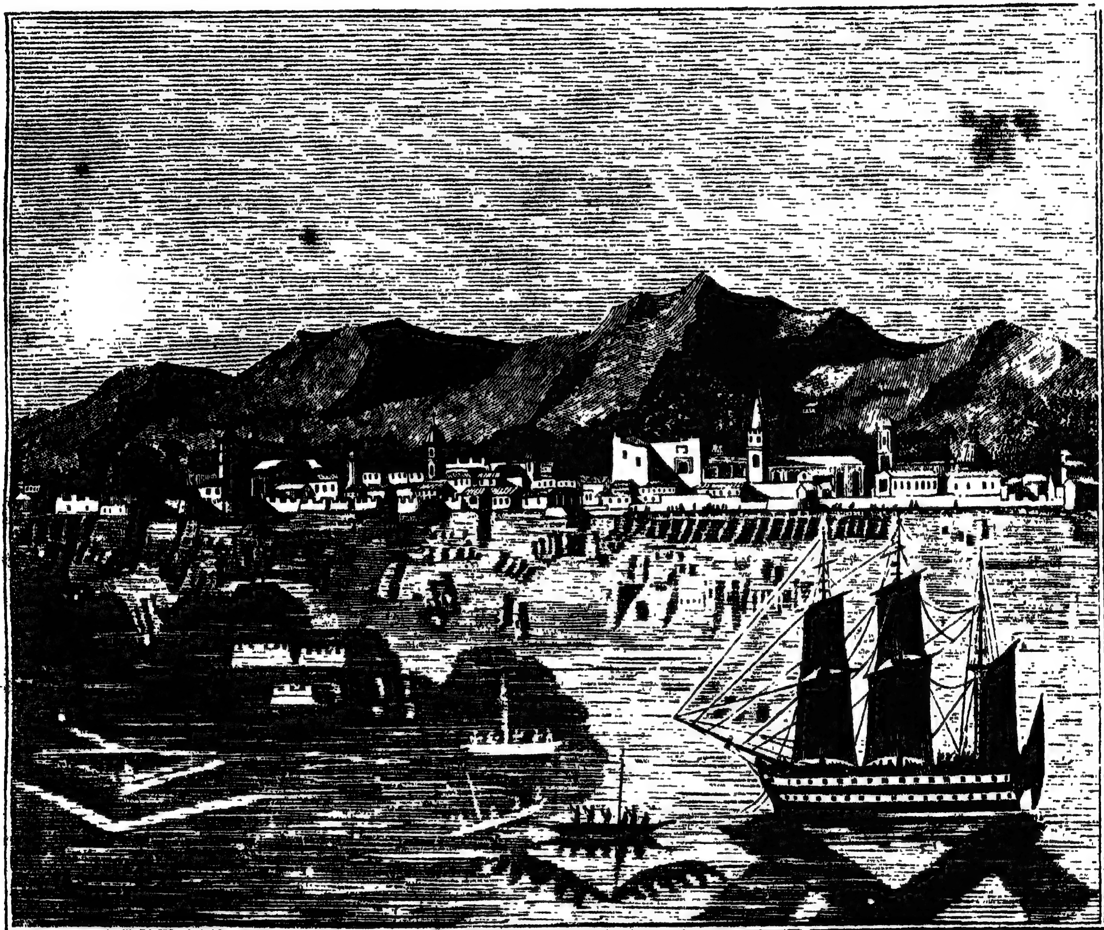
The friar then proceeds to account for the effects of the Fata Morgana, by an inclination of the surface of the sea, and its subdivision into different planes by the contrary eddies. The aërial reflections he refers to the influence of saline and other effluvia suspended in the air; but here his reasoning is far from being productive of any clear statement. He asserts, however, (what, indeed, the reason of our readers would suggest,) that all the objects exhibited in the Fata Morgana are derived from real objects on shore reflected in all senses, magnified, mingled, and multiplied without end.

A writer in Nicholson's "Journal of Science," who first made the Dominican's dissertation known in this country, derives from his account,—that by the form and situation of the Faro of Messina, the current from the south, at the expiration of which the phenomenon is most likely to appear, is so far impeded by the figure of the land, that a considerable portion of the water returns along shore;—that it is probable the same coasts may have a tendency to modify the lower portion of air in a similar manner during the southern breezes, or that a

* Travels in Sicily.

sort of basin is formed by the land, in which the lower air is disposed to become calm and motionless;—that the Morgana presents inverted images beneath the real objects, and that these inverted images are multiplied laterally as well as vertically;—that in the aërial Morgana, or vision in the air, the objects are not inverted, but more elevated than the original objects on shore;—that the fringes of prismatic colours are produced in falling vapours, and to be explained by the principles of refraction;—that it seems more probable that these magical appearances are produced by a calm sea, and one or more strata of superincumbent air, differing in refractive and consequently reflective power, than from any considerable change (as fancied by the Friar) in the surface of the water, with the laws of which we are much better acquainted than with those of the atmosphere;—that the polished surface of the water may account for the vertical repetitions; but for the lateral multiplications, recourse must be had to reflecting or refracting planes in the vapour, which appear as difficult to establish as those which have been supposed in the water.

It will be felt, from what has been said, that though the phenomenon may be referred to natural causes, some difficulty still exists as to the modes in which some of the effects are produced. This ought not to surprise us, when we reflect that the Fata Morgana in its more perfect state—or when the vision is represented both in air and water—is of rare occurrence and of very short duration, and that the inhabitants of the particular spot where it occurs are not much given to the study of natural philosophy.



[Effects of the Fata Morgana.]

The Pestilent Erysipelas.—Sauvages, (a French physician and botanist, who died in 1767,) under the head of *Erysipelas pestilens*, arranges the fatal epidemic disease, which prevailed extensively in the early and dark ages, as the sequel of war and famine, and which has received a variety of denominations; such as *ignis sacer*, *ignis Sti. Anthonii*, *mal des ardens*, *ergot*, *kriebel-krankheit*, &c. &c., according to the various modifications and degrees of severity, or according to the supposed cause of it. The erysipelatous redness, however, followed by the dry gangrene, which often destroyed the limbs joint by joint, was only one of the forms or stages of that disease; as the contracted and palsied state to which the ancients gave the name of *sceloturbe*, constituted another. Instead of originating from eating rye affected with the *ergot*, as was supposed in France, or barley with which the *raphanus* was mixed, as was imagined in Sweden, the disease was, doubtless, the result of deficient nourishment,—a severe land-scurvy, which was a great scourge of the ancient world, and often denominated *pestilence*. The name of St. Anthony seems to have been first associated with an epidemic disease of this kind, which prevailed in Dauphiné about the end of the twelfth century. An abbey, dedicated to that saint, had recently been founded at Vienne, in that province, where his bones were deposited; and it was a popular opinion, in that and the succeeding century, that all the patients who were conveyed to this abbey were cured in a space of seven or nine days; a circumstance, which the ample supply of food in those religious houses may probably satisfactorily explain.—*Bateman on Cutaneous Diseases.*

⁂ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

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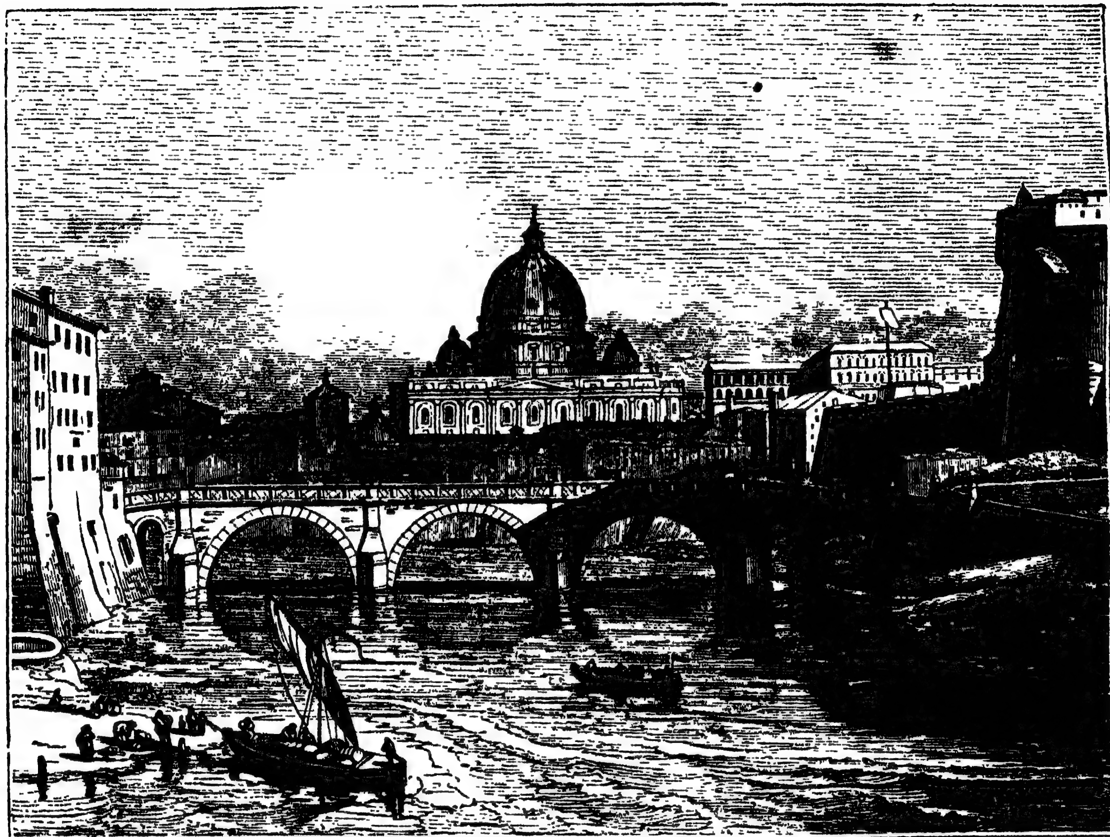
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ST. PETER'S.—No. 1.



[View of St. Peter's from the East, above the Bridge of St. Angelo.]

THE historian Gibbon, after alluding to the many beautiful edifices that adorn the ancient capital of the world, exclaims, " but these lesser stars are eclipsed by the sun of the Vatican, by the dome of St. Peter's—the most glorious structure that ever has been applied to the use of religion!"

" This temple," says Count Stolberg, " is the largest and most magnificent on earth!—the square before it is worthy of the temple; the temple of the square—each in its kind is the most magnificent in the world. No work of man ever seized upon and filled my mind like this."

These feelings of enthusiastic admiration are common to every person of taste that has visited this triumph of architecture and Italian genius, and rich and beautiful extracts might be made from writers of all countries who have paid their tribute to

————The vast and wondrous dome
To which Diana's temple was a cell *.

It is this towering dome or cupola which mainly gives St. Peter's its sublimity, and blinds even the severe architectural critic to many technical defects which are undeniably involved in the structure of the whole.

The dome of the Pantheon, an ancient Roman edifice, still in a state of almost perfect preservation, had for many ages excited the wonder and admiration of mankind, and this Bramante, the first planner of St. Peter's, would have imitated in the modern church. But the dome of the Pantheon rested on columns and attained no striking elevation. " A similar cupola," said Michel Angelo with the confidence of genius, " will I raise in the air!" And this was done by constructing walls sufficiently strong to sustain the enormous weight.

In whatever direction the traveller approaches Rome, he sees the sublime dome towering into the blue heavens. It seems to invite him from afar, and increases the impatience which all must feel on a first visit, to arrive at the eternal city.

Like our own St. Paul's, but with the immense advantage of being almost constantly seen through the medium of a pure transparent atmosphere, it forms a grand and conspicuous object in almost every distant view of the city of which it is the glorious crown. It may be seen from the hills of Baccano on the north—from the lower Apennines on the east—from the volcanic ridges of the Alban mount on the south—and from the mast-head of a ship in the Tyrrhene gulf of the Mediterranean on the west—and in all these views it rises up from the broad flat of the Campagna, in which the " seven hills" and other elevations in the vicinage of Rome are of themselves ridges or breaks

* Lord Byron's " Childe Harold," canto iv. The temple of Diana of Ephesus, the wonder of the ancient world, is alluded to.

scarcely more perceptible than a distant wave at sea. It seems to reign in solitary majesty over all the dead and for the most part uncultivated level which surrounds the city; and is, perhaps, never so impressive an object as when seen thence, particularly on the stated festivals, on the evenings of which it is suddenly, nay almost instantaneously, covered with a flood of light. The reader may conceive this effect by fancying the dome of St. Paul's lighted up by innumerable lamps and torches; but he must add, in the case of St. Peter's, "the deep blue sky of Rome," without a cloud, without a vapour or wreath of smoke.

In general opinion, however, it appears to most advantage from elevated points within or near the city, where other objects can be brought into comparison with it. The tower of the Capitol, the front of the Quirinal palace, the bridge of St. Angelo, and the fields behind St. Peter's in the direction of the Villa Pampili Doria, are all fine points of view; but the best of these near points is that from the public walks on the Pincian Hill, and the best moment for enjoying it is towards sunset on a summer evening, as the dark mass then projects a bold and graceful outline against the bright western sky, and the horizontal rays of the sun pierce through and brilliantly illuminate the windows of the lantern under the cupola, thus producing a truly magical effect. It is here and on the bridge of St. Angelo that the people of Rome chiefly resort on the great festivals, when the cupola is illuminated. This splendid exhibition occurs on the eve, and on the evening of St. Peter's day, and on the anniversary evening of the reigning pope's election. At one hour of the night, in Italian time, or an hour after sun-set, rather from the immense number of hands employed than from any ingenious mechanical contrivance, the dome is converted into an hemisphere of liquid light, and this, as we have said, almost instantaneously.

On a still nearer view, or one taken from the piazza or square of St. Peter's, though the temple itself loses from the heavy, awkward structure of the front, which more than half hides the cupola while it is out of harmony with the general form of the church, yet the scene, from its accessories, is one of imposing sublimity. Instead of being cooped up like St. Paul's, St. Peter's there presents itself as the back-ground of a noble and spacious amphitheatre formed by a splendid elliptical colonnade of a quadruple range of nearly three hundred pillars.

A beautiful Egyptian obelisk which had once adorned the centre of the circus of Nero, and still remained standing on its original site, was removed by Domenico Fontana, one of the architects of St. Peter's, to this piazza or square, which was further beautified by two magnificent fountains, each consisting of an immense basin nearly thirty feet in diameter at the level of the pavement, with a stem springing out of the centre supporting two diminishing granite basins at different heights, and raising itself to a height of upwards of fifty feet. From the summit of each of these stems or shafts gushes and sparkles a torrent of water, the central jets of which rise to nearly seventy feet from the pavement in perpendicular height, and thence the water falls in a triple cataract from the summit of the jets into the upper, which is the smallest vase or basin,—then, passing over the rims of this upper basin in an enlarged column, it descends into the second basin, from which, in still greater volume, it drops into the lowest,—the largest basin of the three,—thus producing the beautiful effect of a cone of falling water.

The quantity of water thus in continual play is so great that the materials of the fountains are completely enveloped and hidden from view, though of course, owing to the translucency of the fluid, the general form of the fountains is obvious enough. The copious supply of water is brought by an ancient Roman aqueduct from the Lake of Bracciano, about seventeen miles from Rome.

The effect of these fountains is striking and beautiful beyond description, and unlike the mere water-works in the grounds of the French palace at Versailles, which are only made to play on grand occasions, their flow is perpetual and undiminished.

The grand colonnades of the piazza* are met at their western extremity by enclosed corridors which lead by an inclined plane up to the ends of the transverse corridors which join on to the vestibule of the church itself. These last form throughout a range of four hundred and eighty feet in length. At one of their extremities an equestrian and colossal statue of Constantine the Great stands in a niche, and a similar statue of Charlemagne occupies a corresponding niche at the other extremity.

Five portals, two of which are, however, comparatively diminutive, give access to the vestibule; and opposite to these portals five door-ways open to the interior of the wonderful temple. The doors are covered with bronze, which is worked into bassi-rilievi of great beauty.

Such are the principal features of the exterior of St. Peter's.

[To be continued.]

FLAYING ESTABLISHMENT AT MONTFAUCON.

A TRANSLATION into German has been made of Mr. Babbage's late work, "The Economy of Machinery and Manufactures," to which the translator has added some valuable notes. One of them contains an extract from a paper read by Professor Burdach to the Physico-Economical Society of Königsberg, on what is called the Flaying Establishment at Montfaucon, near Paris. This is probably the most curious example in the world of the manner in which materials, which are commonly thrown away, and scarcely even pay the cost of removing them, may be turned to profit. There are, no doubt, many other substances as well as the bones, flesh, and entrails of dead horses, which are daily allowed to run to waste in great quantities, and which, in like manner, under judicious and systematic management, and by the application of processes familiar to the present advanced state of the arts, might be saved and converted to important uses. The present account may serve as an illustration and indication of how this might be done.

The first person who instituted an establishment on a considerable scale for the profitable employment of what are commonly regarded as the waste parts of dead animals, was the son of the celebrated Cadel de Vaux. This was in the year 1816. Another chemist, named Fouques, also about the same time carried on a manufactory for the preparation of various soups and other sorts of food for beasts, from the flesh, bones, and entrails of animals that had died or been put to death as useless. But at present the principal establishments of this description are the two at Montfaucon, on the high ground to the north of Paris, where the business is confined to the flaying and profitable preservation of the parts of dead horses. One of these establishments belongs to a M. Dussaussais, and the other to a company. Some of the horses are dead when they are received,—others are brought to be killed on the spot. They then undergo the following processes:—

1st. First, the hair of the mane and tail is cut off. As, however, the long hair used for weaving of cloth is commonly wanting, the produce is but small, and will barely exceed a quarter of a pound of horse-hair, a pound

* It is curious how the people of London have reversed the meaning of the word piazza, which ought to be pronounced piatza. In Covent Garden, the only place where it is applied, the open square occupied by the market ought to be called the piazza, and not the colonnade which runs round part of it.

of which is sold for about five pence English. The produce of one horse, in this particular, is therefore about one penny.

2nd. The skin is now taken off, laid together, and sold, while fresh, to the tanners in the neighbourhood. It weighs in general about sixty pounds, and sells for from nine to twelve shillings English.

3rd. The blood is allowed to run to waste, and to flow on the ground, a circumstance which greatly increases the horrible filth at Montfaucon. If it were collected in gutters, it might be used either as food for cattle or as manure, and a cruor prepared from it for sugar-refiners, who pay for blood, so prepared, about two shillings and five pence the cwt.

4th. The shoes are taken off and sold as horse-shoes, if still good enough, or, if not, as old iron. The nails, likewise, are collected and sold, more particularly in the provincial towns. The profit from this source is about two pence per horse.

5th. The feet are cut off, dried, and then beaten on a hard surface, in order to detach the hoofs; or, in winter, they are left in heaps to putrefy, until the hoofs become loose. The hoofs are sold to turners, comb-makers, and manufacturers of sal-ammoniac and prussian-blue, who pay for them, if they are rasped, about one shilling and five pence.

6th. The fat is very carefully collected. First, that upon and between the muscles is separated; then the muscles are laid single on the table, and every little bit of fat picked out; and, finally, that of the entrails is detached. The collected fat is cut into small pieces and melted. Horse-fat is used for burning in a flame by enamellers and glass-toy makers. It is also used to grease harnesses, shoe-leather, &c. Soap is manufactured from it; and it produces gas for lighting. The pound is sold for five pence three farthings. A horse yields, on an average, eight pounds, worth about four shillings; well-fed horses will yield, however, as much almost as sixty pounds, bringing therefore nearly thirty shillings.

7th. The flesh is used for food by the workmen, who choose the best pieces for themselves, and leave the rest to dogs, cats, hogs, and poultry. The feeding of the workmen, however, with the flesh of such as have been killed, is a part of the system of economy that could not be practised in this country. Many circumstances show that a large number of the people of France resort to expedients for food which would be revolting to an Englishman. The flesh is used likewise as manure, and in the manufacture of prussian blue. A horse has from three hundred to four hundred pounds of flesh, which yields in this way a profit of from thirty to near forty shillings.

8th. The sinews or tendons being separated from the muscles, the smaller ones are sold fresh to the glue-makers, and the larger dried and disposed of in great quantities for the same purpose. A horse yields about one pound of dried tendons, worth twopence three farthings.

9th. Of the bones nearly three hundred and fifty thousand pounds are annually sold: the remainder serves for fuel, and chiefly for melting the fat. A considerable quantity is sold to cutlers, fan-makers, and other workmen who use bones; but more to the manufacturers of sal-ammoniac and ivory-black. The pound of bones sells for about a farthing English; and as a single horse produces ninety pounds of bones, the profit is about one shilling and eleven pence. The bones would, however, yield much more if they were ground in mills as is done in Auvergne and Strasburg; for the cwt. of bone-meal, an excellent manure, fetches nearly seven shillings and sixpence.

10th. The small guts are wrought into coarse strings for lathes, &c. The other entrails are piled up and sold in a state of putrefaction as manure. A two-horse load brings from four shillings and sixpence to nine shillings.

11th. Even the maggots, which breed in great numbers in the putrid refuse, are not lost. Small pieces of flesh and entrails, to the height of about half a foot, and slightly covered with straw, are piled up in the sun. The flies, attracted immediately, deposit their eggs in these, and, in a few days' time, the whole becomes a living mass, the putrefying substance being reduced to a very small quantity. The maggots are sold by measure, partly as baits for fishing, but chiefly as food for fowls and pheasants. The entrails of a single horse generate these maggots in such plenty as to yield a profit of nearly one shilling and sixpence. Many, besides, are metamorphosed into the musca carnaria, cæsar, and vivipara, so that there are, at Montfaucon, great swarms of these flies, which again attract vast multitudes of swallows, and make the neighbourhood of Montfaucon the favourite shooting-ground of the Parisian sportsmen.

12th. The rats at Montfaucon play a part equally important. As these animals find here abundance of food, and the females bring forth every year from twelve to eighteen young, there is an innumerable host of them in the place. Sixteen thousand have been killed in four weeks in the same room, without any decrease being perceived. They undermine the walls, so that the buildings give way, and can be secured only by surrounding the foundations with broken glass. The whole neighbourhood has been excavated by them to such a degree that the ground shakes beneath your feet. They are caught by placing the fresh carcass of a horse alone in an apartment, the walls of which have openings at the bottom. The next morning these holes are stopped, and all the rats killed; their skins are then sold at three shillings per hundred.

In this manner we see, that the various parts of a dead horse, converted into articles of trade and consumption, yield, according to a calculation which has been made, when of middling quality, two pounds thirteen shillings, and when very superior, nearly five pounds. A dead horse is bought at first for from nine shillings to thirteen shillings and sixpence,—to which add from four shillings and sixpence to six shillings as wages for the collector and labourers; still there remains a profit of about thirty-six shillings to the establishment. Now, according to the statement of M. Parent Duchâtelet, there are thirty-five horses, on an average, every day, or twelve thousand seven hundred and seventy-five every year, brought to Montfaucon from Paris and the surrounding neighbourhood;—this altogether affords a profit of about twenty-three thousand pounds sterling.

As another evidence that substances which appear spent and exhausted may sometimes still be rendered useful, we may mention in conclusion, that a Mr. Owen, a manufacturer of ivory-black at Copenhagen, has lately discovered a simple process by which to restore bone-black already used to its original value. The result is so perfect, that the same stuff may be used over again a number of times. This will be a great saving in the refining of sugar, and allow many bones to be preserved for other purposes. In no respect are the English people more wasteful than in the article of bones.

Pursuit of Knowledge.—By looking into physical causes our minds are opened and enlarged; and in this pursuit, whether we take or whether we lose the game, the chase is certainly of service.—*Burke.*

HYMN BEFORE SUNRISE IN THE VALE OF CHAMOUNI.

Hast thou a charm to stay the Morning-star
In his steep course? so long he seems to pause
On thy bald, awful head, O sovran Blanc!
The Arve and Arveiron at thy base
Rave ceaselessly; but thou, most awful form,
Risest from forth thy silent sea of pines,
How silently! Around thee, and above,
Deep is the air and dark, substantial, black,
An ebon mass: methinks thou piercest it
As with a wedge! But when I look again,
It is thine own calm home, thy crystal shrine,
Thy habitation from eternity!—
O dread and silent Mount! I gazed upon thee,
Till thou, still present to the bodily sense,
Didst vanish from my thought: entranced in prayer
I worshipp'd the Invisible alone.

Yet, like some sweet beguiling melody—
So sweet we know not we are listening to it—
Thou, the meanwhile, wast blending with my thought,
Yea, with my life and life's own secret joy:
Till the dilating soul,—enrapt, transfused,
Into the mighty vision passing—there,
As in her natural form, swelled vast to Heaven!

Awake, my soul! not only passive praise
Thou owest—not alone these swelling tears,
Mute thanks, and secret ecstasy! Awake,
Voice of sweet song! Awake, my heart, awake!
Green vales and icy cliffs, all join my hymn!

Thou first and chief, sole Sovran of the Vale!
O, struggling with the darkness all the night,
And visited all night by troops of stars,
Or when they climb the sky, or when they sink:
Companion of the Morning-star at dawn,
Thyself earth's rosy star, and of the dawn
Co-herald!—wake, O wake, and utter praise!
Who sank thy sunless pillars deep in earth?
Who fill'd thy countenance with rosy light?
Who made thee parent of perpetual streams?

And you, ye five wild torrents, fiercely glad!
Who call'd you forth from night and utter death,
From dark and icy caverns call'd you forth,
Down those precipitous, black, jagged rocks,
For ever shattered and the same for ever?
Who gave you your invulnerable life,
Your strength, your speed, your fury, and your joy,
Unceasing thunder and eternal foam?
And who commanded (and the silence came),—
Here let the billows stiffen, and have rest?

Ye ice-falls! ye that from the mountain's brow
Adown enormous ravines slope amain—
Torrents, methinks, that heard a mighty voice,
And stopp'd at once amid their maddest plunge!
Motionless torrents! silent cataracts!
Who made you glorious as the gates of Heaven,
Beneath the keen full moon? Who bade the sun
Clothe you with rainbows? Who, with living flowers
Of loveliest blue, spread garlands at your feet?—
God! let the torrents, like a shout of nations,
Answer! and let the ice-plains echo, God!
God! sing, ye meadow-streams with gladsome voice!
Ye pine-groves, with your soft and soul-like sounds!
And they, too, have a voice, yon piles of snow,
And in their perilous fall shall thunder, God!

Ye livery flowers that skirt th' eternal frost!
Ye wild goats, sporting round the eagle's nest!
Ye eagles, playmates of the mountain-storm!
Ye lightnings, the dread arrows of the clouds!
Ye signs and wonders of the element!
Utter forth God, and fill the hills with praise!

Once more, hoar Mount! with thy sky-pointing peaks,
Oft from whose feet the avalanche, unheard,
Shoots downward, glittering thro' the pure serene,
Into the depth of clouds that veil thy breast—
Thou too again, stupendous Mountain! thou,
That as I raise my head, awhile bow'd low
In adoration, upward from thy base,
Slow travelling with dim eyes suffused with tears,
Solemnly seemest, like a vapoury cloud,
To rise before me.—Rise, O ever rise!
Rise, like a cloud of incense, from the earth!
Thou kingly spirit, throned among the hills!
Thou dread ambassador from earth to Heaven!
Great hierarch! tell thou the silent sky,
And tell the stars, and tell yon rising sun,
Earth, with her thousand voices, praises God!

Coleridge.

THE BURROWING-OWL AND PRAIRIE DOG.

[The following interesting account of the burrowing-owl is abridged from the splendid continuation of Wilson's "American Birds," by Charles Lucien Bonaparte.]

Venerable ruins, crumbling under the influence of time and vicissitudes of season, are habitually associated with our recollections of the owl; or he is considered as the tenant of sombre forests, whose nocturnal gloom is rendered deeper and more awful by the harsh dissonance of his voice. In poetry he has long been regarded as the appropriate concomitant of darkness and horror. But we are now to make the reader acquainted with an owl to which none of these associations can belong; a bird that, so far from seeking refuge in the ruined habitations of man, fixes its residence within the earth; and instead of concealing itself in solitary recesses of the forest, delights to dwell on open plains, in company with animals remarkable for their social disposition, neatness, and order. Instead of sailing heavily forth in the obscurity of the evening or morning twilight, and then retreating to mope away the intervening hours, our owl enjoys the broadest glare of the noon-tide sun, and flying rapidly along, searches for food or pleasure during the cheerful light of day.

In the trans-Mississipian territories of the United States, the burrowing owl resides exclusively in the villages of the marmot or prairie dog, whose excavations are so commodious as to render it unnecessary that our bird should dig for himself, as he is said to do in other parts of the world, where no burrowing animals exist. These villages are very numerous, and variable in their extent, sometimes covering only a few acres, and at others spreading over the surface of the country for miles together. They are composed of slightly-elevated mounds, having the form of a truncated cone, about two feet in width at base, and seldom rising as high as eighteen inches above the surface of the soil. The entrance is placed either at the top or on the side, and the whole mound is beaten down externally, especially at the summit, resembling a much-used footpath.

From the entrance, the passage into the mound descends vertically for one or two feet, and is thence continued obliquely downwards, until it terminates in an apartment, within which the industrious marmot constructs, on the approach of the cold season, the comfortable cell for his winter's sleep. This cell, which is composed of fine dry grass, is globular in form, with an opening at top capable of admitting the finger; and the whole is so firmly compacted, that it might, without injury, be rolled over the floor.

It is delightful, during fine weather, to see these lively little creatures sporting about the entrance of their burrows, which are always kept in the neatest repair, and are often inhabited by several individuals. When alarmed, they immediately take refuge in their subterranean chambers; or, if the dreaded danger be not immediately impending, they stand near the brink of the entrance, bravely barking and flourishing their tails, or else sit erect to reconnoitre the movements of the enemy.

In all the prairie-dog villages the burrowing-owl is seen moving briskly about, or else in small flocks scattered among the mounds, and at a distance it may be mistaken for the marmot itself when sitting erect. They manifest but little timidity, and allow themselves to be approached sufficiently close for shooting; but if alarmed, some or all of them soar away and settle down again at a short distance; if further disturbed, their flight is continued until they are no longer in view, or they descend into their dwellings, whence they are difficult to dislodge.

The burrows into which these owls have been seen to descend, on the plains of the river Platte, where they are most numerous, were evidently excavated by the

marmot, whence it has been inferred by Say, that they were either common, though unfriendly residents of the same habitation, or that our owl was the sole occupant of a burrow acquired by the right of conquest. The evidence of this was clearly presented by the ruinous condition of the burrows tenanted by the owl, which were frequently caved in, and their sides channelled by the rains, while the neat and well-preserved mansion of the marmot showed the active care of a skilful and industrious owner. We have no evidence that the owl and marmot habitually resort to one burrow; yet we are well assured by Pike, and others, that a common danger often drives them into the same excavation, where lizards and rattlesnakes also enter for concealment and safety. The owl observed by Viellot, in St. Domingo, digs itself a burrow two feet in depth, at the bottom of which its eggs are deposited on a bed of moss, herb-stalks, and dried roots.

The note of our bird is strikingly similar to the cry of the marmot, which sounds like *cheh, cheh*, pronounced several times in rapid succession; and were it not that the burrowing-owls of the West Indies, where no marmots exist, utter the same sound, it might be inferred, that the marmot was the unintentional tutor to the young owl: this cry is only uttered as the bird begins its flight. The food of the bird we are describing appears to consist entirely of insects, as, on examination of its stomach, nothing but parts of their hard wing-cases were found.

The figure of the burrowing-owl is copied from C. Bonaparte's work, in which a representation of this singular bird was first given.



[Burrowing-Owls and Prairie-Dogs.]

ASCENT OF MOUNT ÆTNA.

[In No. 86 we gave a narrative of the recent eruption of Mount Ætna. The gentleman who favoured us with that description has furnished us with the following account of his previous ascent of the mountain.]

From what I have said about the eruption of 1832, you may perhaps feel an interest in hearing an account of a journey which I took up to the very summit of Ætna, only fifteen months prior to this. All was then perfectly still, nor was it until I arrived at the top that any traces of recent fire were visible. It was in the middle of August that I undertook this adventure.

I started from Riposto, where I took measures for my journey. Being the height of summer, it was rather difficult to believe that, even in the regions of Ætna, we could suffer from cold. However, as all travellers agreed that the cold of Ætna was the most piercing they ever endured, I preferred their report to any of my own theories; and it was well for me that I did. A good travelling roquelaure cloak, and a suit of winter clothing, which I put on at Nicolosi, were accordingly what I provided myself with. A gentleman of Riposto, at whose house I was kindly entertained, and who had several times before visited the mountain, accompanied me; which was a very fortunate circumstance, as I do not know any journey in which the company of one conversant in the roads and mazes of the path is so advantageous, I might say *necessary*, as in this; independent of our guide, whose sole business it is to show us our way.

We chose our time to a nicety. First, I had contrived matters so that I might have the benefit of the moon, which was very nearly full; and although accidents seldom happen, from the careful manner in which the mules pick their way, in the thickest obscurity, among the roughest and vilest roads imaginable, yet, from what I saw, I cannot say that I should prefer to go up Ætna in the dark, while it was possible to go in the light. And

yet the day-time is inconvenient, as one of the great objects is to reach the summit at sunrise. Some manage to get up to the "English house," as it is called, at sunset, sleep there, and proceed up the cone at twilight the following morning. Against this plan I have heard very strong objections on the score of health. The "English house" is in a region of perpetual frost; or at least where, if the heat of the sun in July and August thaw the snow during the day, the moment night comes on it again congeals. So sudden a transition from the plains to this has been productive of serious effects. To avoid this, we set out from Riposto about mid-day. We got to Nicolosi about sunset. Here we took some refreshment and rest. The moon rising about ten o'clock at night, we started, and kept on our way, halting a few minutes in the wood to give bait to our animals, and finally arriving at the English house an hour before sunrise. We put the mules into the stable, and proceeded on foot, reserving ourselves for breakfast on our return.

Setting off from Riposto, the country over which we have to travel, to judge from its productions, would consist of the richest soil I ever saw; and this is the case where it is not covered by the lava, which has evidently remained many centuries, and upon which vegetation has partially returned. The way that ground destroyed by lava regenerates has been accounted for as follows: there are frequent flaws in it which attract the dust, which in course of time forms a shallow layer of earth, producing weeds, which, when rotted, become the means of attracting more soil. The crevices and interstices are thus filled up with soil which is as rich as any other, and sometimes of great service; for the fibres of vines, and many other trees, the roots of which shoot deep into the earth, will be found to have entered these cracks or crannies, and there to have taken such a hold, that they cannot be torn up by heavy rains, or carried away by torrents. The time, however, required for this must be at least several centuries. The whole of the road from Riposto to Nicolosi is over lava, in many places so compact as not yet to be serviceable; but where there were plantations, none surely ever looked more beautiful and flourishing.

The road to Nicolosi is certainly the worst I ever travelled over; nor do I see how it is likely to be mended. The rise, however, is so gradual up as high as Nicolosi, that you are quite insensible of it.

Until our arrival at Nicolosi we were in our summer clothing. The temperature there is certainly cooler, but not to any very considerable degree, and, I hear, it is seldom they are visited with snow. The vineyards, however, do not continue much higher, for the woody region commences within three or four miles. I was here surprised to see none but large forest-trees, principally oak and elm, but no bushes or jungle. I noticed this more particularly on my descent the following day, and that the ground was overspread with fern and long grass only. I also observed that every one of these trees (some of them noble ones) were rotten at the core. There is a great sameness in the road through the forest, which may be from six to eight miles across. This has a beautiful appearance in looking at Ætna from a distance; a perfect ring being formed, which circumscribes it on all sides so exactly, that it much more resembles the work of art than of nature. The ascent became here considerably steeper, and before we had cleared the wood, we began to feel the cold. We got into the desert region about one o'clock in the morning.

The desert region we found in every respect worthy of the name. Here was a dead void—not only neither tree nor shrub, but not a weed to give us a sign that we were going over ground that had ever been trod by man, or inhabited by the living. There was not even a bird to cross our path. The bat and the owl had never probably been here; and what must be the depth of a solitude shunned even by these? We saw before us near ten long miles of black uneven surface, never varying but from loose cinders to rough lava-stone. It was indeed a dreary road. Our horses' hoofs rung with a melancholy sound on our ears. We spoke but little, and felt no inclination to converse. We wrapt our cloaks around us, and shut ourselves up in a "shroud of thoughts." This continued till we arrived at the "Casa Inglese," or English house, which is a hut useful to travellers who visit Ætna, standing at the foot of the cone, and most conveniently situated, inasmuch as the road at this part becomes so bad as to make it scarce passable for any animal. Visiters are obliged to dismount, and pick their way on foot, which they must do very carefully. We encountered a species of lava like nothing we before had passed. This resembled that substance which is thrown out of blacksmiths' shops, vulgarly called "clinkers." Our boots here suffered most wofully, nor do I think that the strongest would have lasted half a mile of such a road. On arriving at the steep part of the cone, it was equally difficult, but less perilous. I should think that a fall upon such ground as I have described must be dangerous in the extreme, for though one's hands may be at liberty, they would but ill defend you. It was ten times more uneven than the deepest ploughed field I ever saw; and from the little purchase the foot has when it rests on the points of this lava, the difficulty of retaining one's equipoise is greater than seems possible to those who have never been there. The ground deceives you by not yielding to the pressure of the foot, as you cannot help expecting it to do every moment. If ever you saw a cat pick her way along a wall, the ridge of which is fortified with broken glass, you will bring it to remembrance, and think that my passage at this juncture was neither more agreeable nor easy.

I can in some measure allow for the various and inconsistent accounts of this mountain which have been brought us by different travellers, all equally respectable in point of veracity, and yet differing so widely in particulars. Every eruption alters the face of things. Sometimes this change or this eruption is not visible; for example, in the previous December a dull flame was descried at the mouth of the crater, barely seen from Catania;—it only lasted three days, and was thought nothing of. This we found had been an eruption, which had considerably altered the appearance of the crater, and were surprised no one had named the circumstance, though it must have required one who had known the state it was in before to have perceived the change. Our guide led us up the side of the cone, which he was certain was the easiest of ascent. I had seen a picture taken from the spot, of travellers on the cone of Ætna, and observed at the time that it must have been greatly exaggerated, as it would not be possible to ascend what resembled a perpendicular rather than a slope. I now, however, found that the picture was too true. The fatigue here became immense. Then there was a wind, which had all the bitterness of the winter wind in England, without any of that force and buoyancy which the air has in the colder regions, whilst the continual ascent made my legs and thighs ache intolerably. I could not stop to rest, for I was always up to my knees in ashes, which underneath were quite warm, or if not, it was because the surface of the ashes was supported by a bed of snow. Sometimes one leg was in snow and the other in warm ashes. All the pits are filled with snow. I felt my strength going sensibly, and notwithstanding I had come all the way on purpose to visit the crater, I entirely gave up the task, and therefore, though not fifty yards from the mouth, began to descend. I thought, however, though I could not go up I might go round the cone, and proceeded accordingly; when, on

arriving at the south-western side of it, I found that the *wall* (if you may call it so) of the crater had been broken down by some recent violence, and that the way was open for us to enter, without either the difficulty of climbing up to the highest ridge or the danger of descending inside, an exploit which few travellers, however great their thirst for knowledge, willingly perform. You may conceive my delight on being able thus to view, without risk or trouble, the great phenomenon which so many a modern Pliny has come here for, and in vain. Had I had any conception I should have been able to have explored the crater, as I certainly think I might, I would have arranged for it, and made some observations which I am not without hopes would have been serviceable to future travellers. As it was, I arrived there exhausted from travelling all night on horseback, among ruts and precipices, where I was afraid to close my eyes, and was so fatigued by the ineffectual attempt which I made to reach the summit on the wrong side that my legs trembled under me, while the rarity of the air increased my difficulty in breathing. I sat down, and could have slept, so completely was I bereft of that ardour which had prompted me to undergo the toils of the journey. My regret is, that on finding such an opportunity for discovery I was not able to take advantage of it.

[To be concluded in our next.]

THE RAINBOW.

[The following reflections on this phenomenon are extracted from a work of considerable talent, Mr. Burke's "Beauties, Harmonies, and Sublimities of Nature." We have been favoured with the author's corrections of the passage, as it is intended to appear in a third edition of his book, which is now preparing for the press.]

The poets feigned the rainbow to be the residence of certain aërial creatures, whose delight it is to wanton in the clouds. Milton, in his exquisite pastoral drama, thus alludes to this Platonic idea:—

> I took it for a fairy vision
> Of some gay creature in the element,
> That in the colours of the rainbow live,
> And play i' th' plighted clouds.

The rainbow, which, not improbably, first suggested the idea of arches, though beautiful in all countries, is more particularly so in mountainous ones: for, independent of their frequency, it is impossible to conceive any arch more grand (if we except the double ring of Saturn) than when its extreme points rest upon the opposite sides of a wide valley, or on the peaked summits of precipitate mountains.

One of the glories which are said to surround the throne of heaven is a rainbow like an emerald. In the Apocalypse it is described as encircling the head of an angel; in Ezekiel, four cherubim are compared to a cloud, arched with it: and nothing, out of the Hebrew scriptures, can exceed the beauty of that passage in Milton, where he describes its creation and its first appearance.

There is a picture, representing this emblem of mercy, so admirably painted, in the castle of Ambras, in the circle of Austria, that the grand duke of Tuscany offered a hundred thousand crowns for it. Rubens frequently gave animation to pictures, which had little beside to interest the eye of the spectator, by painting this phenomenon: one of Guido's best pieces represents the Virgin and Infant sitting on a rainbow: and round the niche in which stood a statue of the Virgin in the chapel of Loretto, were imbedded precious stones of various lustres, forming a rainbow of various colours.

The rainbows of Greenland are frequently of a pale white, fringed with a brownish yellow; arising from the rays of the sun being reflected from a frozen cloud. In Iceland it is called the Bridge of the Gods; and the Scandinavians gave it for a guardian a being called Heindaller. They supposed it to connect heaven with earth. Ulloa and Bouguer describe circular rainbows, which are frequently seen on the mountains, rising above Quito, in the kingdom of Peru; while Edward asserts, that a rainbow was seen near London, caused by the exhalations of that city, after the sun had set more than twenty minutes. A naval friend, too, informs me, that as he was one day watching the sun's effect upon the exhalations, near Juan Fernandez, he saw upwards of five and twenty *iris marinæ* animate the sea at the same time. In these marine-bows the concave sides were turned upwards; the drops of water rising from below, and not falling from above, as in the instances of aërial arches. They are sometimes formed, also, by waves dashing against the rocks: as may frequently be seen on the coast of Carnarvon, Merioneth, Pembroke, Cardigan, and Carmarthen.

In some rainbows may be discovered three arches within the purple of the common bow: 1. yellowish green, darker green, purple; 2. green, purple; 3. green, purple. Rainbows, too, are sometimes seen when the hoar-frost is descending; and Captain Parry, in his attempts to reach the North Pole by boats and sledges, saw a fog-bow, and no less than five arches formed within the main one, all beautifully coloured.

Aristotle states, that he was the first who ever saw a lunar rainbow: he saw only two in fifty years. He assuredly means he was the first who ever described one; since lunar rainbows must have been observed in all ages. That it was unknown to St. Ambrose, however, is evident, from his belief that the bow, which God promised Noah, he would place in the firmament, after the deluge, "as a witness, that he would never drown the world again," was not to be understood of the rainbow, "which can never appear in the night; but some visible virtue of the Deity." Notwithstanding this assertion of St. Ambrose, I have had the good fortune to see several; two of which were, perhaps, as fine as were ever witnessed in any country. The first formed an arch over the vale of Usk. The moon hung over the Blorenge; a dark cloud, suspended over Myarth; the river murmured over beds of stones; and a bow, illumined by the moon, stretched from one side of the vale to the other.

The second I saw from the castle overlooking the bay of Carmarthen, forming a regular semicircle over the Towy. It was in a moment of vicissitude; and fancy willingly reverted to that passage of Ecclesiasticus, where the writer describes Simon, shining "as the morning-star," and "as a rainbow" on the temple of the Eternal. The sky soon cleared, and presented a midnight scene like that, which Bloomfield has described so admirably:—

> "——above these wafted clouds are seen
> (In a remoter sky, still more serene),
> Others detached, in ranges through the air,
> Spotless as snow, and countless as they're fair;
> Scatter'd immensely wide from east to west,
> The beauteous semblance of a flock at rest.
> These, to the raptur'd mind, aloud proclaim
> Their mighty Shepherd's everlasting name.

THE FOUNTAIN OF THE ELEPHANT AT PARIS.

Among the features of the French capital which most remarkably distinguish it from London are to be reckoned its numerous fountains. From the more perfect manner in which the conveyance of water to the houses of the inhabitants is effected in London, public fountains or conduits in the streets are scarcely now required in any part of this city; although, before the introduction of the present system of water-works, we had them in considerable numbers. Like anything else placed in the middle of a great thoroughfare, such erections would be extremely inconvenient in modern London, where the busy traffic along all our principal streets demands every inch of room that can be obtained. But in our squares and other open places, fountains, with jets, might be introduced with a highly ornamental effect. The beauties of architecture and statuary might here be combined with other attractions especially appropriate to such green oases in the heart of a large dusty town—with the elegant forms of the projected water, and the feeling of coolness and refreshment always produced by the sight of that element in motion. The want of fountains and jets of this description,—for with the exception of that in one of the courts of the Temple, there is nothing of the kind in our squares, or even in the royal parks,—is one of the greatest defects of London.

In Paris, in 1825, according to Dulaure's history of that city, there were one hundred and twenty-seven public fountains. Many of these are very handsome structures; indeed, so important have they been con-

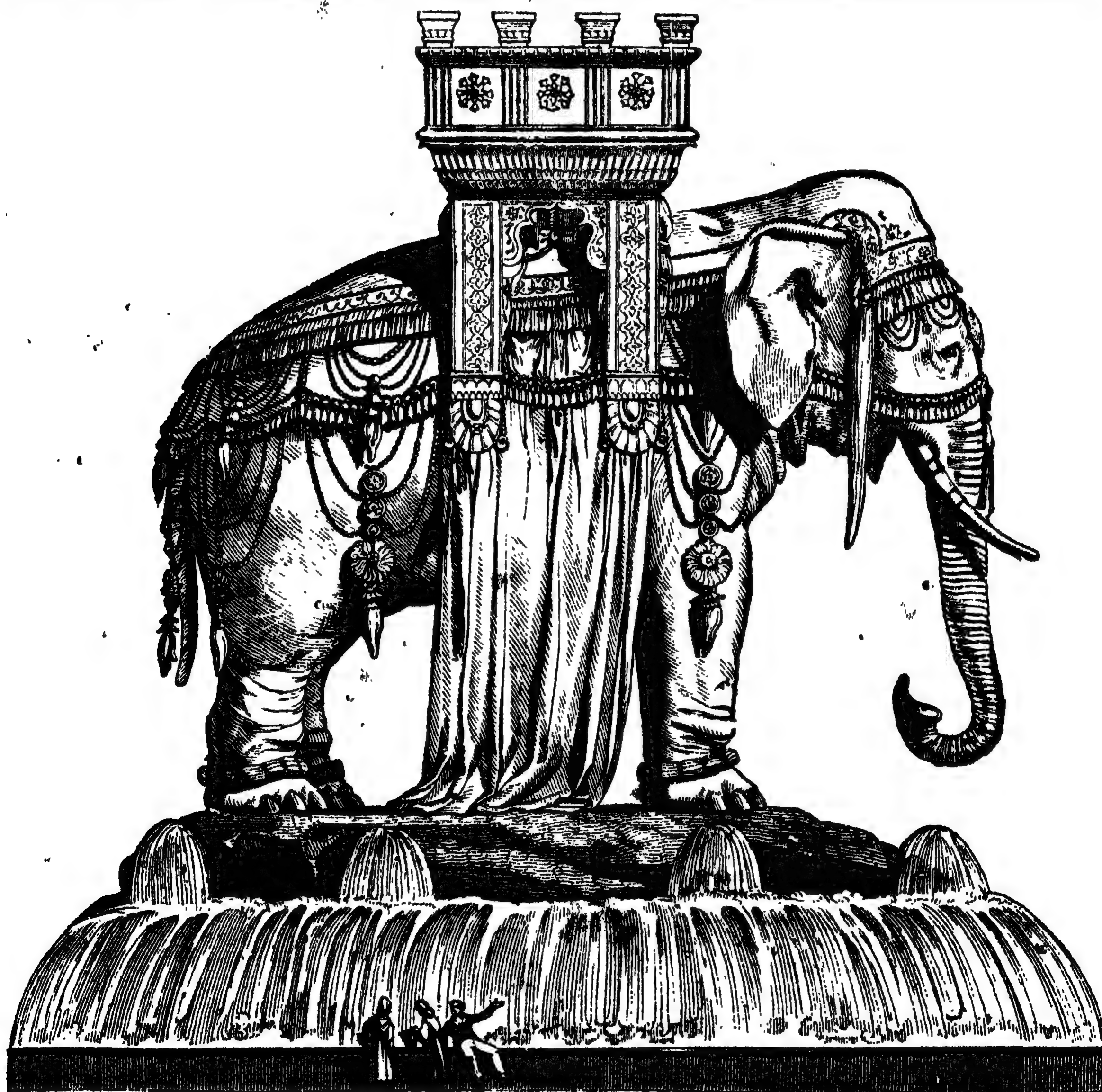
sidered as architectural monuments, that a collection of elaborate engravings of them has been published, accompanied with descriptions. The wood-cut which we give at the end of the present notice represents one which, although long designed, has never yet been erected—the famous Fountain of the Elephant. This was one of Napoleon's many projects for the embellishment of the capital of France. The Fountain of the Elephant was to have been erected in the centre of the oblong rectangular space which now occupies the site of the Bastille, between the canal of St. Martin and the Arsenal. It was one, and might be considered indeed the crowning one, of many improvements, which would almost have rendered this the most superb quarter of Paris. The decree for the erection of the fountain was dated on the 9th of February, 1810, and it named the 2nd of December, 1811, as the day on which the structure should be completed. The foundation, accordingly, was laid in the course of the year 1810; but to the present day nothing further has been done in the execution of the magnificent design. The model, however, in plaster-of-Paris, still exists; and even from that it may be felt how fine the effect of the intended erection would have been. This model is kept in a large shed where it was originally put up, close by the proposed site of the fountain. It may be seen upon proper application; and its enormous dimensions and fine proportions will abundantly repay the curiosity of the visitor.

Upon the massive pedestal of stone was to have been placed a colossal elephant in bronze, surmounted by a tower, as seen in the cut, the whole forming a figure of about eighty feet in height. A staircase leading up to the tower was to have been concealed in one of the legs of the figure, each of which was to have been six feet and a half in thickness. The fountain was to have been adorned with twenty-four bas-reliefs in marble, representing the arts and sciences.

The foundation and model of this unexecuted conception remain as memorials of how sometimes—

"Vaulting ambition doth o'erleap itself."

The bronze for the enormous elephant was to have been obtained from the cannons captured by the imperial armies in Spain, in that contest, then only in its first stage, the course and issue of which some time after contributed so materially to hurl from his throne the proud military chief, who thus so arrogantly anticipated conquest while on the eve of discomfiture and destruction.



[Design for the Fountain of the Elephant at Paris.]

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THE CACHEMIRE GOAT.



[Cachemire Goats.]

The above representation of the Cachemire Goat is taken from the fine work of F. Cuvier and G. St. Hilaire, on Mammiferous Animals. The specimen, in the Jardin des Plantes at Paris, of which that work contains a portrait, was sent from Calcutta, having been obtained from the menagerie of the Governor-General of India, where it was born of a couple that came direct from Cachemire to Bengal. The wool of this goat appears, by a scrupulous comparison, to be quite as delicate as the finest brought from Thibet. Cachemire, however, contains several breeds of goats with fine wool; a specimen was recently sent to England, which differed from that in France by having longer ears. But they all yield, apparently, the same produce; for the fineness of the wool is occasioned by the influence of the climate.

There are two sorts of hair which nature seems to have furnished, more or less, to every quadruped: the one, fine, curly, generally grey, and imparting to the skin a down more or less thick, as if to guard it against cold and damp; the other, coarse, flat, giving a general colour to the animal, and appearing in numerous instances to be an organ of sensation.

These two sorts of hair generally become thicker, according to the degree of cold to which they are exposed; and the frizzled hair becomes gradually finer as the cold increases in dryness. It is this frizzled hair of the Cachemire goat which renders these animals so valuable; for to this we owe those delicate shawls which are so deservedly esteemed for a variety of qualities found in no other article of clothing.

The French have attempted to introduce this breed of goats into their own country; but the success of the experiment seems somewhat doubtful. It is, however, singular, as observed by Messrs. Cuvier and Hilaire, that no European has yet availed himself of the wool produced by most of our domestic goats, which, though less delicate than the Thibet, would undoubtedly have yielded a web far more fine and even than the most admired merino sheep.

The male goat, in the Menagerie of the Jardin des Plantes, is admired for his symmetry, his graceful motion, and his quiet temper. But he has a much greater distinction—he is free from smell; whereas nearly all European goats are known to emit a strong, unpleasant odour. The Cachemire goat is of middling size; two feet high at the neck joint, and two feet ten inches from the snout to the root of the tail; his head from the snout between the horns is nine inches, and his tail five. His horns are erect and spiral, diverging off towards the points. His silky hair is long, flat, and fine, instead of gathering

up in bunches like that of the Angora goats. It is black about the head and neck, and white about the other parts of the body. The woolly hair is always of a greyish white, whatever be the colour of the rest.

MINERAL KINGDOM.—SECTION 12.

ORGANIC REMAINS.—(*Continued.*)

ALTHOUGH the forms of leaves and other parts of plants impressed upon stones, and petrified wood and vegetable substances found in a fossil state, had long ago attracted the attention of naturalists, it is only very lately that the subject of "Fossil Botany," as it has been termed, has been investigated by men of science competent to throw light upon it. M. Adolphe Brongniart in France, and, more recently, Professor Lindley in this country, have directed their special attention to this curious and difficult branch of geological inquiry. By the former of these eminent botanists, the materials which had been collected by earlier observers have been examined anew, and have been classed in accordance with the principles of botanical arrangement in the present more advanced state of that science. M. Brongniart, by those researches into earlier writers, by a personal inspection of specimens in the museums of most countries in Europe, and by extensive communications with distinguished botanists and geologists, has arrived at some very important general results, which he has developed in a special work entitled "Histoire des Végétaux Fossiles;" and in that and in his "Prodrome d'une Histoire des Végétaux Fossiles," has sketched such a system of classification as will greatly facilitate the future prosecution of fossil botany. In our language, a work entitled "The Fossil Flora of Great Britain" has been begun by Professor Lindley and Mr. William Hutton of Newcastle-on-Tyne, which bids fair to be of great use in extending our knowledge in this field. The subject is yet in its infancy; but when it has been further investigated by botanists who possess accurate and extensive knowledge to surmount the great difficulties with which it is attended, it cannot fail to throw much light upon the geological history of our planet.

The plants, of which fossil remains have been met with, belong to every one of the six great classes into which the vegetable kingdom is divided; there is no great *class* of vegetable structure which did not exist prior to the deposition of the tertiary strata. For the sake of our general readers, we will shortly state which these classes are, and give an example of a plant belonging to each. The classes are founded mainly upon the particular provision which nature has made for the reproduction of the plant:—1. *Agamæ* are those plants which have no special organs of fructification, the term being taken from the Greek words *a*, without; and *gamos*, marriage;—all the sea-weed tribe belong to this class. 2. *Cellular cryptogamæ*, or those with a concealed seed apparatus (*cryptos* being Greek for concealed), and composed of cellular tissue without vessels, such as the moss tribe. 3. *Vascular cryptogamæ*, those having a concealed seed apparatus like the former, but with vessels or a vascular structure: the very numerous tribe of ferns belong to this class. All the plants of these three first classes are flowerless. 4. *Gymnospermous phanerogamæ*, those with exposed organs of reproduction or flowers, (*phaneros* being Greek for apparent or evident,) but with naked seeds, (*gymnos*, naked; *sperma*, seed.) such as the fir-tree tribe. 5. *Monocotyledonous phanerogamæ*, those with flowers, but having a seed composed of one lobe (*monos*, single; *cotyledon*, lobe). Wheat, and all grasses, and the palm-tree, belong to this class. 6. *Dicotyledonous phanerogamæ*, those with flowers and two cotyledons, or seed lobes, (*dis*, double, and cotyledon,) which is by far the most numerous class, the greater number of trees and plants we see around us in this country belonging to it: the common bean is a good example of the double cotyledon. Some of the *families* or *orders* of each class are met with in the fossil state: there are different genera of each order, some corresponding to living genera, others that are now extinct; and in most of the genera several species have been discovered, but almost all of these are now extinct. It is a remarkable circumstance that no trace of grasses of any sort has yet been found in the fossil state, but when one considers the vast number of extinct land animals, belonging to the graminivorous tribes, of which the bones are scattered over so many countries, it is hardly possible to conceive that grasses did not exist in former states of our globe. Vegetable remains are generally most abundant in the older strata, and it would almost seem as if there had formerly existed some condition of the atmosphere under which the putrefactive process went on more slowly than in the later ages, while the tertiary strata were forming: a greater proportion of carbonic acid gas than is now contained in the atmosphere would have that effect. In speaking of animal remains, (No. 76—8th June, 1833,) we have alluded to a notion prevalent among some geologists, that there has been in creation a gradual passage from the simple to the most complicated structures,—what is termed a *progressive development*; and we stated our reasons for believing that such a notion has proceeded more from our ignorance of the structure of those animals which we call simple, than from any want of a refined and beautiful mechanism in their frames. The same idea exists on the subject of plants but it has been very satisfactorily disproved by Professor Lindley. The plants of most simple structure are met with only in the superior strata, while in the older strata, such as the coal measures, and where vegetable remains are most in abundance, we have not only palms and other plants of the same tribe, the most highly developed that we know in the monocotyledonous class of the existing æra, but other plants that are met with in great numbers in the same strata, called sigillariæ and stigmariæ, belong in all probability to the dicotyledonous or most highly organized class of plants.

The time which elapsed from the commencement of the deposition of the older secondary strata, to that of the most recent of the tertiary beds, appears to be divisible into four great botanico-geological periods, of unequal duration, during each of which vegetation exhibited a common character. Each of these periods, therefore, is characterized by peculiar classes of plants, or, in the language of botanists, may be said to have a FLORA of its own; and each period embraces a certain number of the series of stratified rocks which compose the crust of the globe. During the continuance of each of those periods, vegetation seems to have undergone only gradual and limited changes—to have been subject to no changes which had an influence upon the essential character of the vegetation, taken as a whole; but, on the contrary, there is between one period and another a marked division, a sudden change in the most important characters of the vegetation. There exists no species common to two successive periods; all is different; and a new *ensemble* of plants, which must have been produced under circumstances different from those which pre-existed, replaces the old vegetation. The four great periods are as follows:—

A.—*The First Period* includes the coal measures and all the strata containing organic remains which lie below them. (M. to Q. Diagram in No. 51, 19th of January.)

B.—*The Second Period* comprehends the vast deposits of red sandstone, magnesian limestone, and a sandstone lying above that limestone,

called the new red sandstone. (L. and part of K.)

C.—*The Third Period* commences with a kind of shelly limestone, that forms a member of the upper part of the group of red marly sandstone (K.), and includes all the superior secondary strata up to the chalk. (G. to I.)

D.—*The Fourth Period* includes all the strata more recent than the chalk. (C. to F.)

It is a remarkable circumstance that the periods are separated by strata, which, if not entirely destitute of *land* plants, contain them in very small quantity. Thus A. is separated from B. by a formation of coarse sandstone, (called by geologists the red conglomerate,) in which plants are of rare occurrence, and by the magnesian limestone in which marine plants are almost exclusively found: again, B. and C. are separated by the shelly limestone (muschelkalk of geologists), which is almost destitute of vegetable remains: and, lastly, C. is separated from D. by the chalk, in which, with rare exceptions, only marine plants have yet been found.

First Period.—The lowest strata in which animal remains are found contain also those of plants, so that it would appear that animal and vegetable life were from the first co-existent. The plants in the older sandstones are for the most part marine, but the impressions are usually indistinct. Black carbonaceous matter, without any organic form, is by no means unfrequent, and sometimes in considerable quantity, and it is not improbable that it is of vegetable origin, for fossil plants are very commonly found in the state of charcoal. It is in the beds of coal, and in the sandstones, clays, and limestones which accompany them, that vegetable remains first occur in profusion, and there are few phenomena in geology more remarkable than those enormous accumulations of vegetable matter from which the coal-beds have been derived. We shall advert more fully to this subject when we come to treat specially of coal, and shall only at present touch generally upon the character of the vegetation of the period. The most distinguishing feature of it is the great numerical preponderance of the third class; viz., the vascular cryptogamæ, and the prodigious size which the plants attain. They constitute five-sixths of the whole flora of the period, while they do not form the proportion of one-thirtieth in the vegetation of the present time. The ferns of temperate regions are low plants with stems rising scarcely a few inches above the ground, but in the equatorial regions there are what are called tree-ferns, which have a stem from twenty to thirty feet high. Now the different kinds of fossil ferns of this period often correspond with the tree-ferns of the tropics, as is attested by the remains of their stems which are occasionally met with. The plants called lycopodiums by botanists constitute another order of this class, and are of a kind intermediate between tree-ferns and the fir-tree tribe. Those now existing never exceed the height of three feet, and are usually weak prostrate plants having the habits of mosses; but the fossil lycopodiums attain gigantic sizes, stems having been found above three feet in diameter, and seventy feet long. There is in this period a much smaller proportion of the fourth and fifth classes, in comparison with what occurs in existing vegetation, and, with the exception of the fir-tribe which was very common, the existence of the dicotyledonous class is little more than conjectured. The plants which constitute by far the larger proportion of the flora of the first period belong to genera which exist, of such dimensions, only in the warmest countries of the globe; and it is evident, therefore, that the climate of the north of Europe and America must have been at least as hot as that of the equatorial regions, at the time the plants grew which are now buried many fathoms under ground in the coal-mines of those countries, for all the circumstances attending them exclude the idea of the plants having been drifted from southern latitudes into those situations.

Second Period.—The red sandstones which were deposited so extensively at this period are even more destitute of vegetable than they are of animal remains. This absence of organic remains is a very remarkable and inexplicable circumstance, considering the great extent occupied by these deposits in all countries, and their vast thickness. The plants hitherto found in the lowest strata of the period have been almost exclusively marine, the few exceptions being vascular cryptogamæ resembling those of the first period. In the superior beds a few of the coniferæ or fir-tree tribe have been found, and some that are supposed to belong to the monocotyledonous class.

Third Period.—The lowest stratum of this period contains very few plants, and these chiefly marine; but they become more abundant in the sands, sandstones, clays, and limestones that succeed each other in numerous alternations up to the chalk. Many belong, however, to an entirely new race of plants from any which had previously existed. There are no longer the gigantic ferns and lycopodiums of the first period,—the same families exist, but the character of excessive luxuriance disappears, and species analogous to plants—now natives of the Cape of Good Hope and New Holland—become common. The whole of the flora of the period consists almost exclusively of the third and fourth classes, and nearly in equal proportions: the rarity of the fifth and sixth classes, that is, of monocotyledonous and dicotyledonous plants, is very remarkable. Among those belonging to the fourth class, viz. the gymnospermous phanerogamæ, there is an extraordinary preponderance of the family called *cycadeæ*, a family scarcely so numerous now over the whole globe as it was then in the small part of Europe where its fossil remains have been found: it constitutes now not above a thousandth part of existing vegetation, whereas it forms one-half of what remains of the flora of this period. The chalk, which constitutes the upper strata of the period, has not afforded as yet more than a few marine plants, and scarcely a trace of land plants, so that a complete change had taken place in the nature of the country surrounding those parts where the chalk was deposited, from what had existed immediately before.

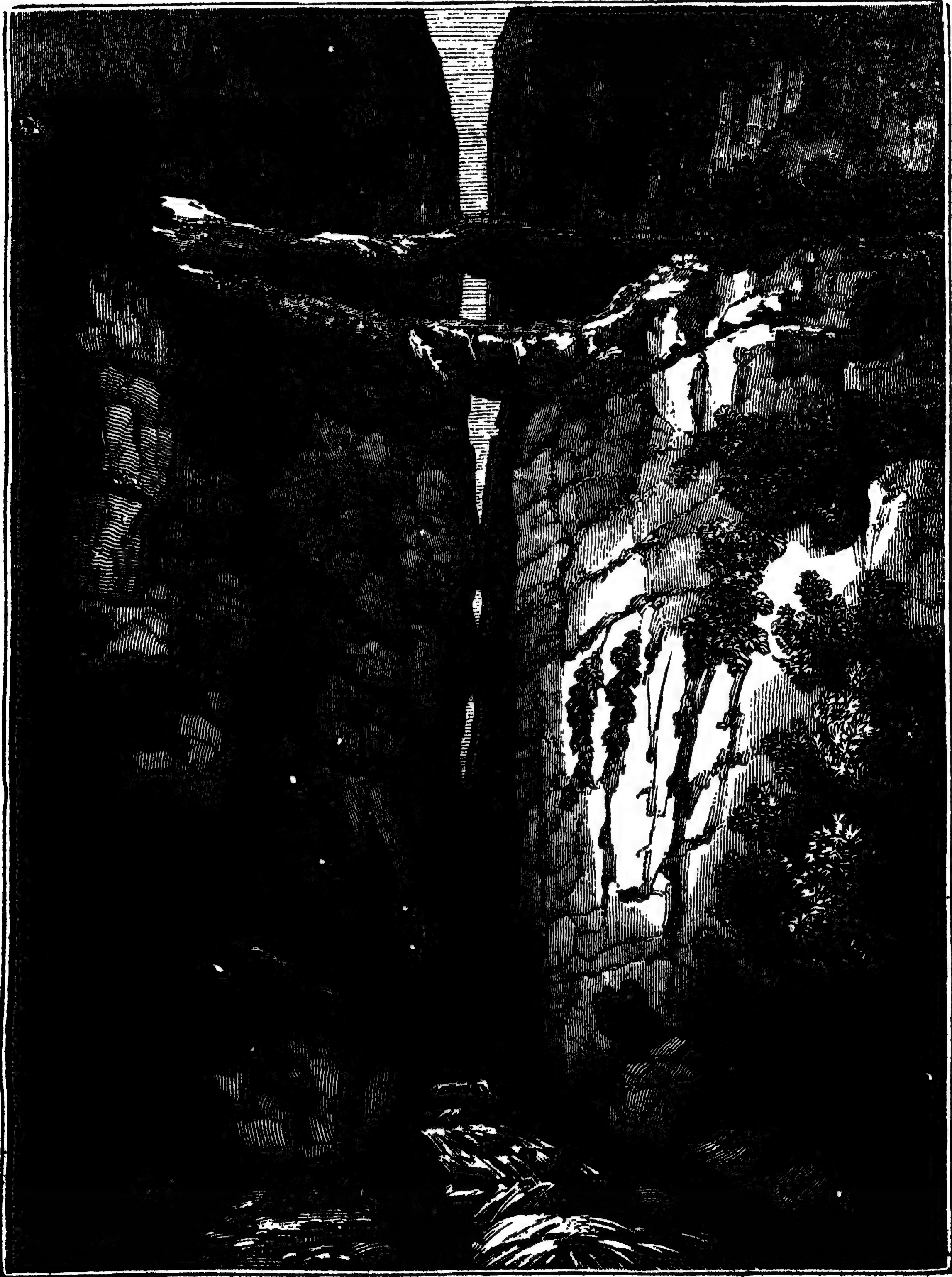
Fourth Period.—From the termination of the deposit of the chalk formation, we discover in the animal and vegetable remains the commencement of resemblances to species which now exist; the proportion gradually increases in the newer strata, until at last the flora of the latest tertiary deposits differs very little in character from that of the present time in the same countries. In the beds immediately above the chalk, ferns and cycadeæ again appear, but in greatly diminished proportions; the coniferæ, but very different from those of the older periods, increase in quantity, mixed with palm-trees and others of the monocotyledonous class of tropical regions, associated with dicotyledonous trees, such as the elm, willow, poplar, chestnut, and sycamore. We again meet with local deposits of decayed, or rather altered, vegetable matter, forming thick beds of a kind of coal, which is used in many countries, as on the banks of the Rhine, for fuel,—something intermediate between coal and peat.

The following table, which is taken from the Prodromus of Brongniart, gives a general view of the character of the vegetation of each period, and a comparison of it with that of the present time, by showing the number of fossil species belonging to the several classes hitherto found in each of the four periods, and, at the same time, the total number of living species of the class, as now known to exist. This last enumeration is merely approximate, and the number of living species we know to be considerably understated.

Names of the Classes.	First Period.	Second Period.	Third Period.	Fourth Period.	Living Species.
1. Agamæ	4	7	3	13	7,000
2. Cellular Cryptogamæ	0	0	0	2	1,500
3. Vascular Cryptogamæ	220	8	31	7	1,700
4. Gymnospermous Phanerogamæ	0	5	35	17	150
5. Monocotyledonous Phanerogamæ	16	5	3	25	8,000
6. Dicotyledonous Phanerogamæ	0	0	0	100	32,000
	240	25	72	164	50,350

Thus it appears, that while more than fifty thousand living species of plants have been described, the number of known fossil species did not much exceed five hundred at the time M. Brongniart wrote, viz. in 1828. Several have since been discovered, but the number is still very small; and, without undervaluing what has already been done, we may truly say that the subject is yet in its infancy, not only as regards the mere numerical existence of fossil species, but as to the general laws which future discoveries of new species must unfold to us.

NATURAL BRIDGES OF ICONONZO.



[View of the Natural Bridges of Icononzo.]

In an early Number of the Magazine (No. 13), we gave an account of a remarkable natural bridge in the State of Virginia, North America, and we noticed at the same time the structures of a similar kind in the valley of Icononzo in the Cordilleras. The engraving opposite is a representation of the latter wonderful arches. As we stated before, they were crossed by Humboldt and Bonpland, in September, 1801, on their way from Santa Fé de Bogota to Popayan and Quito; and our engraving is copied from that given by Humboldt in his magnificent volume, entitled "Views of the Cordilleras and Monuments of the Indigenous Nations of America."

The region in which the valley of Icononzo, otherwise called that of Pandi or Mercadillo, is situated, is even in its lowest parts raised to an immense height above the level of the sea. The bottoms of some of its deepest valleys are within a fourth part of the elevation of the Alpine passages of Mount St. Gothard and Mount Cenis. The bridges of Icononzo are placed at a height of about three thousand feet above the ocean. The little mountain torrent, which frets its way in the bottom of the cleft, is called the *Rio de la Summa Paz*, and is at a depth of about three hundred and fifteen feet below the upper bridge. This is formed of an unbroken mass of rock attached to, and making part of the sandstone of which the elevations on both sides are composed. It is forty-seven feet and a half in length; and its breadth is about forty-one feet and a half. The thickness of the mass at the centre is not quite eight feet. The natives have fixed a rudely formed balustrade of canes along its edges, which enables persons passing it to look over without danger.

The other bridge is about twenty yards lower down, and is formed of three large pieces of rock, the central one of which acts as the key of the arch, and supports the other two. This accidental position, as Humboldt remarks, might have suggested to the natives of America an idea of the construction of the arch. "I will not," he continues, "pronounce a decided opinion as to whether these masses of rock have been hurled thither from some distance, or are merely the fragments of an arch which had been broken without being removed from its place, and which was originally of the same kind with the bridge higher up. This last supposition is rendered probable by an accidental collocation of an analogous description presented by the ruins of the Coliseum at Rome, where there are to be seen, in a wall which has half fallen down, several stones arrested in their descent, in consequence of having accidentally formed an arch as they fell." In the middle of this second bridge there is a hole, of about ninety square feet in area, through which you can see the bottom of the abyss below. The torrent seems as if it flowed away into a dusky cavern; and a mournful sound falls on the ear proceeding from an infinite multitude of night birds, that dwell in the dusky cleft, and are to be seen in thousands hovering over the water. It is impossible, however, to catch any of them, and the only mode of obtaining anything like a distinct view of them is by throwing down squibs or torches to produce a momentary light. They were described by the Indians, who call them *cacas*, as being about the size of a hen, and having the eyes of an owl, with crooked beaks. The colour of their plumage is uniform throughout, and of a brownish grey, which makes Humboldt think that they probably belong to the genus *caprimulgus*, of which there are many varieties in this region.

The stream, over which these bridges are suspended, flows from east to west; and the view is taken from the northern part of the valley, from a point where the arches are seen in profile.

ASCENT OF MOUNT ÆTNA.

(*Concluded from No. 93.*)

The sun was now rising, and my attention was directed there. In this I was disappointed; as I have had so many opportunities of seeing the sun rise and set at sea, and I certainly do not hesitate to give the preference to either of these, with regard to the appearance of the *luminary itself*, to the view now presented from the eminence at which I had arrived. But the surrounding country, from the first dawn of twilight to the moment when the sun first appeared, was, I think I may safely say, "beyond conception," to any one who has not been at *this* moment on *this* spot. The moon had passed the full, so that its light was not sufficient to give us a view of the scenery around; besides there always is a dim paleness about reflected light, which glares though at the same time it deceives us. But the instant the sun gave that tinge to the eastern horizon, which I never saw in England, and which is, I believe, peculiar to southern climates, the objects became one by one more distinct.

For several miles down the mountain, not a tree, a shrub, or a herb is anywhere to be seen—nothing but the black cinders. The nearest vegetation is out of the reach of sound, and at such a distance that the eye can perceive no motion; in fact it is one of the few scenes where a panorama might be taken with a striking approach to truth. From such an eminence, as we look down, I do not know whether it is from the rarefaction of the atmosphere, or being so high above that vapour which ever hangs about the lower regions of the earth, or from what other cause, but certainly objects remain distinct at a much greater distance than when on the levels. The effect is that of making the surrounding country appear much nearer than it really is. There is likewise another singularity, no less curious; that is, the stillness and quiet that reign throughout this desert region. We know that even in a perfect calm, on the plains, how the most remote sound is carried along the surface of the earth, to an incredible distance. The slightest murmur of the wind, even in the deserts of Africa, is heard by travellers; and when we cannot distinguish the least motion in the air, we can always discern a confused half-stifled noise. Here, however, though in a breeze so keen that it cut us to the bone, I felt a sort of blank or void in my oral organs, which produced a defective, and rather disagreeable sensation. The wind which blew was conductor of no sound, and from my isolated situation, I was, it seems, almost inaccessible to it. My footsteps I never heard so plainly before, not even in the stillest midnight, although I felt they were not *loud*. Not the least reverberation was distinguishable, and the scene seemed under some spell, in which I could almost have fancied myself included. An enthusiastic Italian, on viewing this glorious landscape at sunrise, exclaimed that the island seemed as if it had been created but last night, and was not yet endowed with the powers of life; and I do not know how to convey any better idea of the view, and the impression made on me, than by quoting his words.

The day was not one of those extremely propitious, but very good; and I should be glad to compound for no worse, were I to go the journey again. Not a single cloud was to be seen; at the same time there was a slight distant haziness in the air, which prevented us seeing Malta. The range of view was, however, prodigious. Being nearly 11,000 feet above the level of the sea, I was not able to find out, without a little search, promontories and mountains which below I had looked up to, and which appeared equally great in their way. Brydone says he is persuaded that Africa is within the range of the visible horizon of Ætna, but in this he must be mistaken. The view from the summit of Ætna is one to arrest the attention of any man, whatever his qualifica-

tions or endowments, with a most riveting interest. The scholar may here see below him the very spots consecrated by the genius of the noblest ancient poets and historians, and scenes which are associated with the dearest of his early recollections. The astronomer will have a new sphere opened to him; for by the great height at which he is arrived he will have left below him those mists and vapours which, nearer the earth, render many thousands of small stars invisible, and others of more difficult vision. The botanist will see a variety of the vegetable tribe, equalled in the same space in no other country. The Lapland productions will be nearest him; while, as his eye moves along, it will insensibly be led to the region, where plants which thrive in the tropics come to perfection, and all this within thirty miles of him. The antiquary may here find ample room for his speculations, for among the numberless calculations as to Ætna, its ruins, the adjacent country, and the antiquity of the volcano itself, none are so satisfactory as not to make us wish for some more authentic conjectures. The minerals which have been extracted from this mountain are numerous; and the museums of Biscari and Givena, in Catania, afford us proof that, on this account alone, a chemist or a naturalist would find an ever-varying source of interest in the examination of the surrounding objects. To the ordinary spectator, the island itself, with the thought of its multitudinous productions, its never-failing fertility, its unrivalled beauty, and the calm serenity which distance throws on the scene, strikes the mind with a sort of awe, that it is, I think, impossible for any man who has been accustomed to think at all not to regard with admiration. Even the dull gaze of rustic ignorance is startled into something more than its wonted sameness. The *coup d'œil* of a spot, permitting the sight of objects which, when below, a man has been accustomed to consider at a wonderful distance, many of them out of sight of one another, and others that he had always looked *up* to; to see these, so far below him that they seem within his grasp, cannot but awaken the attention of the simplest peasant who is moved with any of the springs which animate the rest of the creation.

Having looked on all around and beneath me for some time, I entered the crater. I was certainly surprised at a sight so unlike what I had formed an idea of. It was perfectly walled round by its own ashes in every part except the breach by which I entered. The height of this wall I suppose might be from fifty to seventy feet. The bottom of the crater was a *perfect level*, except being interspersed with about twenty small hillocks, the largest very little higher than a good-sized hay-cock, all of them with proportionate craters, emitting smoke but no fire. The crater, by the imperfect guess which I could make, seemed to be at this time about three miles in circumference, being nearly a perfect circle in form; and I am inclined to think I am not far from the mark in this estimate, as I made the circuit of it at the base, in which my idea of its size was confirmed. With regard to traversing the crater, I am convinced it might have been effected, and also that we might have inspected those minor volcanoes within, but it would have required great care. A single whiff of the nitrous smoke in your face might suffice to lay you senseless: besides the ground underneath, which seemed to be of a sort of coarse sand, was still hot. I never came prepared for such an exploit. To have reached the highest point in the cone, so as to be able to get a peep into the crater, was the boundary of my ambition, and I had timed myself to be back to Riposto by the evening. I was moreover so fatigued by the late efforts I had made, that I felt myself quite unable to make use of what would have been esteemed by many the most fortunate circumstance that could have happened.

The flatness of the bottom of the crater is clear proof, in my opinion, that there exists no vacuum underneath of any consequence. The moment the ebullition occasioned by the elements within ceases, the whole gradually subsides, finds its own level, and consolidates. It is only at the moment of the discharges that there is any depth of hollow below. This is clearly evinced by looking at all the old craters of Ætna (Monte Rossi excepted), where nothing of this sort is discoverable, but a solid mass now occupying nearly to the brim the mouths which only a few years ago vomited, from an immense depth, the most frightful emissions of fire.

I contented myself with taking one or two pieces of the ashes, hot out of one of the hillocks, and proceeded to go round the cone outside. This I found great difficulty in doing, since there was the same sort of hard metallic lava to go over again. Every step I took I had first to make fast a purchase with my hands, thus almost moving upon all fours, so that, to circumscribe the cone, it took a considerable time. We had arrived at the English house, on our way up, at a quarter past four, and though we lost no time in proceeding onwards, did not return to it again until near nine o'clock.

On our return to the English house we made a pretty hearty breakfast. The cold was so great that the wine had become quite thick; and, on entering the stable, the guide found the mules trembling from its effects, notwithstanding they had had plenty to eat during our absence.

THE DEAF TRAVELLER.—No. 4.

Encampments—Intrusions—Travelling Fare—Writing a Journal—Lead Pencils.

Our first day's journey was not performed in company with the caravan, the bulk of which had gone before us to Bakooba, and various other parties were yet to join, that being the place of rendezvous.

We found the yard of the caravansary full of horses, mules, and asses, with their burdens piled up in heaps. These heaps of goods, on this and other occasions, were enclosed within a square formed by a rope, which was fastened to wooden or iron pins driven into the ground. To this rope the cattle were tied, forming a living wall around the packages. There were several such squares; each party of muleteers having their cattle and goods separate. The men generally fix their quarters within the enclosure. This is the form of encampment most commonly used in the yards of caravansaries where there are no covered stables, or where they do not choose to use them; which they seldom do, except in cold weather. When the encampment is not within walls, they prefer to form one great enclosure in a similar manner; yet so that each party, if there be more than one, occupies its own distinct place. The cattle are generally outside, fastened to the rope as before, and the merchandise within; as, indeed, often are the more valuable of the cattle. These are general rules from which there are occasional departures, as danger is or is not apprehended. The goods often, for instance, form part of the exterior line; and while the muleteers commonly like to be *within* the enclosure, travellers often prefer to form their groups *without*, close to the heels of the cattle; generally so composing themselves to rest that their luggage cannot be disturbed without their being roused, or a stir occasioned among the beasts.

Finding the little rooms which the caravansary afforded to be too close and warm for occupation, we, with some others, fixed ourselves and our baggage in the open air, under the shade of a high dead wall, laying out our quilts to recline on, with our baggage under our heads. In Eastern travelling *privacy* is seldom attainable. Even if you get a room, every one feels quite at liberty to come and sit down with you, inquiring into your circumstances and objects, with a freedom which seems impertinent to an European. They also watch

keenly the most minute or indifferent of your operations, and talk freely to one another about them, making a vast number of troublesome inquiries concerning everything they see. To Arabs and Turks, however, the justice is due of saying, that they will generally retire when they see a stranger preparing to eat; and sometimes, perhaps, the traveller will be tempted to eat merely to get rid of them. I do not know whether the Persians, who boast so much of their politeness, have a similar custom: if so, the insatiable curiosity of that people, which in the higher classes it is a point of etiquette to conceal, prevented them from observing it with us; though at times there seemed a show among them of keeping a little in the background on such occasions.

Having no servant, we had no cooking; and except when we came to towns, in whose bazaars ready-dressed meat might be had, we lived mostly on fruits and bread while we travelled with the caravans. Native gentlemen manage these matters more comfortably than those who are not accustomed to their mode of travelling. They have generally a cook and a good supply of cooking utensils with them. And, as in villages, meat is seldom to be had unless a whole sheep be bought, or unless the owner is sure of being able to dispose of all the meat among the travellers before he kills it, they often take with them meat potted in its own fat. A bag of rice, also, is seldom forgotten, as without this grain an Oriental thinks his dinner good for nothing, though with it, lubricated with a little butter, oil, or fat, and garnished with onions, it is, in his view, a feast for a king. Moreover, if the stage be long or tiresome, they will occasionally push on a-head; and, when one comes up with the caravan, they are seen squatting by the wayside smoking their pipes, and sipping the coffee which had been prepared in the interval. They have great facility in getting ready a cup of coffee. Every man carries materials for kindling a fire about him, and the small quantity of fuel necessary to boil the little coffee-pot is easily collected. They let the caravan pass, but soon overtake it; and, on the strength of this occasional refreshment, with smoke and coffee, the two great luxuries of the East, they get on, in excellent condition and spirits, through the most wearisome stages.

When we had dined, and I had purified myself in the stream which flows through Bakooba to the Diulah, I began to write my first entry in the journal which I had made up my mind to keep during the journey, and by which I am now enabled to prepare these papers. I had on former occasions experienced the inconvenience of trusting to memory, or even to rough notes. With this experience, I made it quite imperative on myself, when I left Bagdad, to keep a *full* and regular journal. Possibly I might not have done so, had I been aware of all the difficulty I should find in carrying this determination into effect. I often felt my self-imposed task most grievous when I had to sit down to it in the midst of inquisitive people; often in the open air without shelter from the sun; often when weary, sleepy, faint,—and, at a later period, often when benumbed with cold or blinded with smoke. I can now readily find in my journals the parts I wrote when my eyes were distressed by the glaring sun,—when I could hardly hold the pen from cold,—and when I was drowsy or actually fell asleep over my labour.

When I began to write at Bakooba, my neighbours paid much attention to my operations. On this and a few following days I used a lead-pencil, but soon left it for pen and ink, not only on account of the greater permanence of the writing, but because I was much interrupted and annoyed by the notice the pencil attracted, and the frequent applications made for permission to examine it fully. With the experience of this and former journeys before me, I really do not recollect that any other European article I possessed obtained near so much attention as the black-lead pencil in those parts of Persia and Turkey remote from European intercourse. Its utility was at once perceived; and a thing simply curious, or whose utility was less immediately perceptible to them, was never honoured with such admiring notice. On the present and many other occasions, each man was anxious to know how it was possible to write with solid *ink*, and how the consolidated *ink* got into the *belly* of the wood. Every one was desirous to try the virtues of the wonderful instrument for himself; and, having examined with admiration the characters he had traced, endeavoured by sight, smell, touch, and taste, to find out the qualities of the implement which produced them. The pencil-case also obtained much notice, though the pencil itself was most studied and admired. They were curious, too, to see me writing a character with which they are not acquainted, and in a manner which, as they write from right to left themselves, appeared as writing backward to them. Nor did they omit to inquire *what* was the subject of my writing. The simple truth was told them—that, in my own country, I had friends, who would ask me concerning the things I had seen in my travels; and that I wrote down an account of what I saw that I might be the better able to gratify them. This account of the matter seemed so satisfactory to them that they would sometimes, through my friend, communicate the age and other particulars concerning the cattle, as information which would be acceptable to the friends in my own country. I know not, however, whether my writing so much may not have helped to procure for us the character of *spies*, which we ultimately obtained. The better informed Persians have some idea of the use and advantage of keeping a journal, while travelling or residing in a strange country. Mahomed Ali Khan, of Tabreez, told us that he kept a journal while he resided in England, and on his return from thence; and it seems that, when he came back, the prince who had sent him, Abbas Meerza, read the journal with much interest and amusement. The people of our first caravan, however, were not Persians, but Turks, Arabs, Kourds, and Armenians.

CITY OF ROCHESTER.

One of the richest valleys in England is that through which the Medway—the "Medway smooth," as Milton has called it—flows on to the ocean. Here it makes its way through broad meadows clothed with verdure, or waving in the proper season with abundant harvests; while the high grounds that look down upon it in other parts are also planted or otherwise cultivated to the summit. On the south or right bank of this river, in an angle formed by a bend in its course, stands the small, but ancient and not uninteresting city of Rochester. The subjoined engraving presents a view of it as seen from the north-west. Beyond the bridge is perceived the river coming up from the south; till, having passed the bridge, it suddenly changes its direction, and runs for some distance almost due east. The town is thus skirted by the water on the west and north. To the right, beyond the bridge, lies the town of Strood; and farther down the river to the east, the great naval station of Chatham. The three places form almost a continuous line of houses, of fully two miles in length, and are often spoken of collectively as the "Three Towns." They contain together a population of about 30,000, without including the country parts of the several parishes.

Rochester is a place of great antiquity, having been, there is every reason to believe, a British town before the Roman invasion. Its original name seems to have been *Dourbryf*, signifying the swift stream, in allusion to the character of the river on the banks of which it

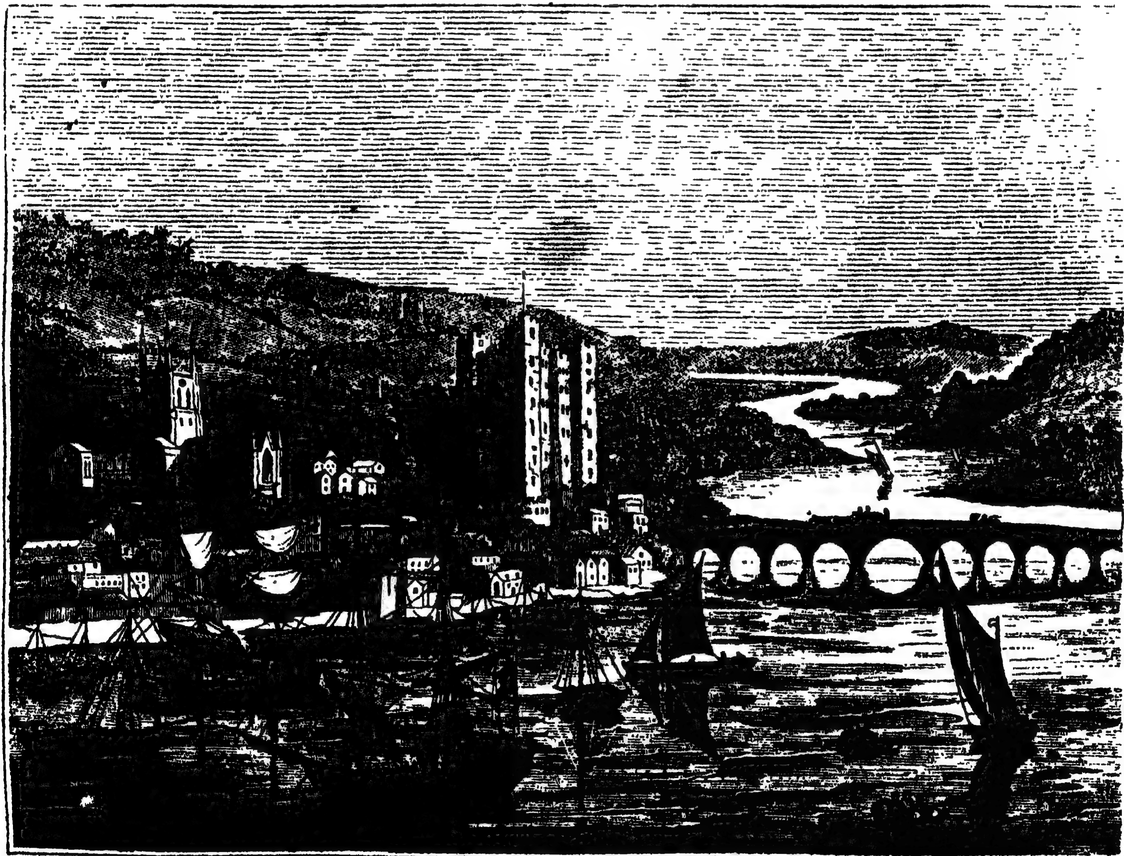
stands. This British designation the Romans, according to their custom, smoothed down into the forms *Durobrovis* and *Durobrovum*, which the Saxons again shortened into *Hroffe*. That, finally, by the addition commonly made in the case of places which had been Roman stations, became *Hroffe-ceastre*, the immediate parent of the modern Rochester. The Saxon *Hroffe*, we may also remark, has been Latinized into *Roffa*, and from this form the Bishop of Rochester takes his common signature, *Roffensis*.

The Roman road from Canterbury to London probably passed through the town of Rochester; and it is supposed that the river was originally crossed here by a ferry, for which a wooden bridge was afterwards substituted. The town appears never to have been very extensive; and is, probably, considerably larger and more populous at present than it was in ancient times. With the parishes of Strood and Frindsbury it contained 12,791 inhabitants by the last census, which was, however, 127 under the number returned in 1821. The population of Rochester Proper is under 10,000.

From ancient documents the city appears to have been walled round, at least so early as the time of Ethelbert I. King of Kent, or about the close of the sixth century. The walls which it then had may have been originally erected by the Romans. Some Roman bricks still are, or were lately to be seen, in the fragments of the old wall that yet remain. As far as the circuit of this ancient circumvallation can be traced, it appears to have formed a parallelogram, the four sides of which nearly fronted the cardinal points. The inclosed space, however, was of very small extent; being only about a quarter of a mile from north to south, and twice that length from east to west. A small tower which occupied the north-east angle of the fortification is still almost entire. It has a winding staircase in the interior. The city gates, of which there were formerly several, have all been long swept away. The last repair which the walls received appears to have been from Henry II., in 1225, on which occasion a fosse or ditch was formed around their base.

Rochester now consists principally of c long street, called High Street, which crosses it from east to west, terminating on the river a little below the present bridge. This bridge is one of the greatest ornaments of the city, and, indeed, is perhaps the finest old bridge in England. It was built in the latter part of the fourteenth century (being completed in 1392), by the famous Sir Robert Knowles, who, in the reign of Edward III., was equally renowned for his military prowess and his piety. It is five hundred and sixty feet in length, and fifteen broad. It has undergone frequent repairs since its first erection, and some of the arches have even been entirely rebuilt. Within these few years a great improvement has been made on it, by throwing the two central arches into one, and thus opening a much wider space for the current of the river and the passage of vessels.

The houses of Rochester are for the most part built with brick, though there still remain several ancient ones of wood. The town has a neat appearance, though in general it has no architectural magnificence to boast of. By far the most conspicuous buildings which it contains are its fine old cathedral, and the ruins of its once strong and commanding castle. We shall give accounts of both in future Numbers. They stand, as they may be seen in the prefixed view, to the south of the High Street, the castle near the river, and the cathedral towards the centre of the city.



[View of the City of Rochester.]

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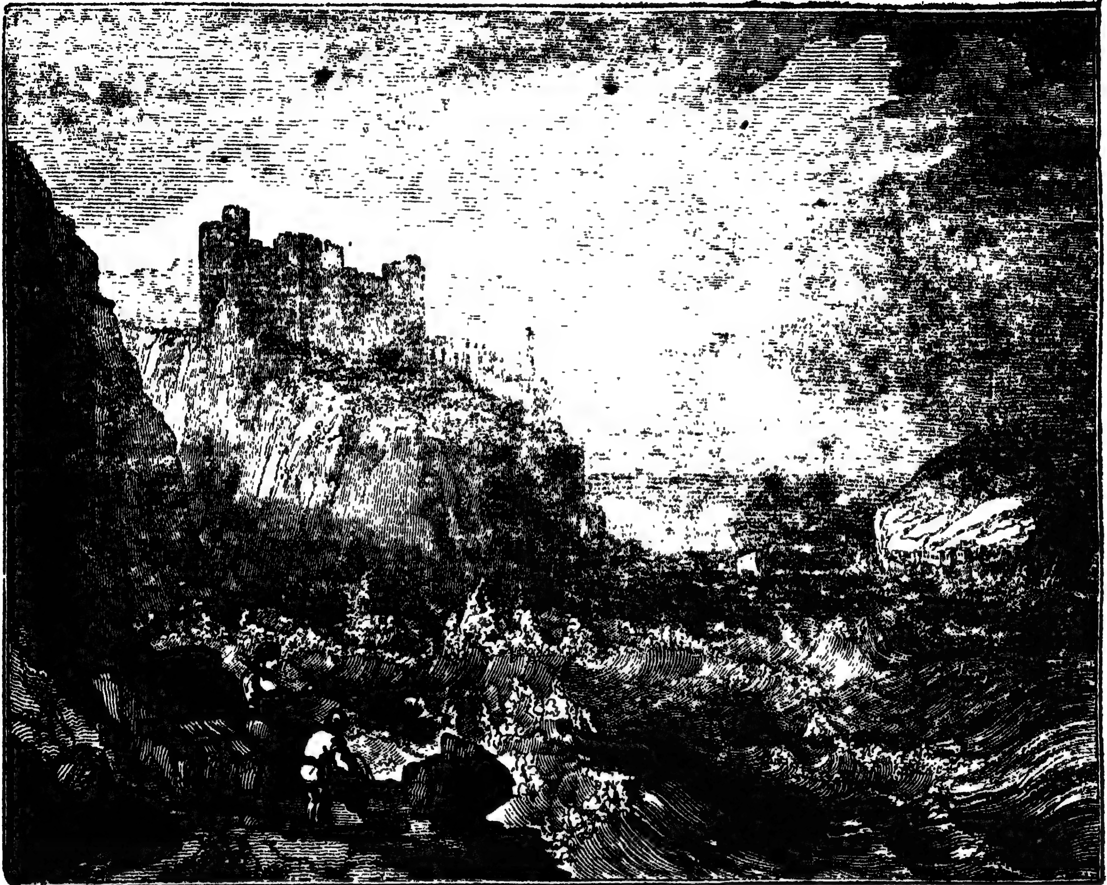
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TANTALLON CASTLE.



[View of Tantallon Castle, with the Bass Rock in the distance.]

This extensive ruin stands on the coast of the German Ocean, about two miles and a half east from the town of North Berwick, in the county of Haddington, otherwise called East Lothian, Scotland. Of the early history of Tantallon, or, as it is often called, Tamtallon, Castle but little is known. Grose, who has given two views of the ruin in his "Antiquities of Scotland," was not able to discover when or by whom it was built, after searching all the authorities within his reach; and the late Mr. George Chalmers, the learned author of the "Caledonia," was equally unsuccessful. There is no doubt, however, that the fortress was one of the most ancient, as it was always considered one of the strongest, in Scotland.

It occupies the summit of an eminence, terminating in a precipitous rock towards the sea, into which it projects so far that, on three of its sides, it is wholly surrounded by the water. On the fourth side, which looks towards the land, it has been guarded by strong outworks, and two ditches, the inner one of which has been of great depth. Its shape has been somewhat irregular, but semi-hexagonal in its general outline. What now remains is principally a long stretch of ragged wall, surmounted by the fragment of a tower, whose weather-beaten front, frowning over the waves, presents an aspect peculiarly desolate and melancholy.

From the earliest date to which its history can be traced, Tantallon Castle was a stronghold of the family of Douglas; and it makes a principal figure in the history of the contests of that turbulent and aspiring house with their sovereign, from the middle of the fifteenth to the middle of the sixteenth century. In 1455, the barony of North Berwick, along with Tantallon Castle, was forfeited by the Earl of Douglas to the crown; but about twenty-five years afterwards these possessions were restored by James III. to the famous Archibald *Bell-the-Cat*, the sixth Earl of Angus, who, in return, afterwards headed the rebellion which cost the unfortunate monarch his throne and his life. Soon after the battle of Flodden, where James IV. was killed, the Earl married his widow, and in this way got into his possession her son, James V., whom he retained in close confinement till the year 1527, when the young king at last contrived to elude his jailer. On this event Douglas took refuge in his castle of Tantallon, and collected there a band of the trustiest of his retainers. From this retreat James immediately prepared to dislodge him; and an old Scottish historian, Lindsey of Pittscottie, has given us a detailed history of the attempt, which curiously illustrates the feeble resources of the Scottish monarchy in these days, when the crown as yet held its precarious supremacy only by an incessant struggle with the barons or great landed proprietors of the kingdom. James, Lindsey tells us, commenced operations by

making proclamation to all the neighbouring counties, Fife, Angus, Strathern, Stirling, Lothian, the Merse, and Tiviotdale, to compear at Edinburgh on the 10th of December, every man bringing with him forty days' victuals, to pass along with the king in person to the siege of the castle. Having collected his forces, he next sent to the Castle of Dunbar to borrow from the Duke of Albany "two great canons, thrawn-mouthed Mow and her marrow, with two great bot-cards, and two moyans, two double falcons, and four quarter falcons, with their powder and bullets, and gunners for to use them." He at the same time "caused three lords to pass in pledge for the said artillery till it were delivered again." But guns, ammunition, and engineers were all to no purpose; they carried on the siege for twenty days, "but," continues the historian, "they came no speed; whether the castle was so strong, or the gunners corrupted by the Earl of Angus's moyen, I cannot tell." The king then, having lost many men and horses, resolved to retire to Edinburgh; but still anxious to obtain possession of the fortress, he opened a negotiation with the captain of the garrison, Simeon Pannango; and at length, by very liberal promises of favour both to himself and his men, induced him to surrender it. "Shortly after," concludes Lindsey, "the king gart garnish it with men of war and artillery, and put in a new captain, to wit, Oliver Sinclair; and caused masons to come and ranforce the walls, which were left waste before as trances and thorow-passages, and made all massy work, to the effect that it should be more able in time coming to any enemies that would come to pursue it." It is a tradition among the soldiers, Grose tells us, that what is called the Scotch March was composed for the troops going to this siege, and that the tune was intended to express the words *Ding down Tantallon.* Scott, in the Introduction to his "Minstrelsy of the Border," has noticed the phrase, "To ding down Tantallon, and make a bridge to the Bass," as an old adage expressive of impossibility. The lofty rock called the Bass, lying two miles out at sea, is a conspicuous object from Tantallon Castle and the neighbouring coast. See an account of it in the "Magazine," No. 82.

The castle was subjected, in the course of the seventeenth century, to two other attacks, which it did not stand so well as it had done that directed against it by James V. In 1639, being then in the possession of the Marquis of Douglas, it was taken by the Covenanters, and dismantled. The injuries it sustained upon this occasion, however, appear to have been soon after repaired, for in the close of the year 1650, when it was held by the Marquis as one of the supporters of the royal cause, it again stood out, for a short time, an assault made upon it by General Monk, who, after the taking of the castle of Edinburgh by Cromwell, was dispatched to reduce that of Tantallon, with three regiments of horse and foot. After playing against it with mortars for forty-eight hours, Monk found that he had made little or no impression on it. He is stated to have then applied his battering-guns, and by this means he soon forced the garrison to surrender at discretion. After this the castle was reduced to ruins; and in that state it has remained ever since. Some time after the Restoration it was sold, along with the Bass, by the Marquis of Douglas to Sir Hugh Dalrymple; in the possession of whose representative both still continue.

USE OF CORN IN ENGLAND.

Abridged from "Vegetable Substances used for the Food of Man."

The Anglo-Saxon monks of the abbey of St. Edmund, in the eighth century, ate barley bread, because the income of the establishment would not admit of their feeding twice or thrice a day on wheaten bread. The English labourers of the southern and midland counties, in the latter part of the eighteenth century, refused to eat bread made of one-third wheat, one-third rye, and one-third barley, saying, that "they had lost their rye-teeth." It would be a curious and not unprofitable inquiry, to trace the progress of the national taste in this particular. It would show that whatever privations the English labourer may now endure, and whatever he has endured for many generations, he has succeeded in rendering the dearest kind of vegetable food the general food of the country. This single circumstance is a security to him against those sufferings from actual famine which were familiar to his fore-elders, and which are still the objects of continual apprehension in those countries where the labourers live upon the cheapest substances. Wages cannot be depressed in such a manner as to deprive the labourer, for any length of time, of the power of maintaining himself upon the kind of food which habit has made necessary to him; and as the ordinary food of the English labourer is not the very cheapest that can be got, it is in his power to have recourse for a while to less expensive articles of subsistence should any temporary scarcity of food or want of employment deprive him of his usual fare,—an advantage not possessed by his Irish fellow-subjects, to whom the failure of a potato crop is a matter not of discomfort merely, but of absolute starvation.

In the satire of Pierce Plowman, written in the time of Edward III., it is said, that *when the new corn began to be sold,*

> "Woulde no beggar eat bread that in it beanes were,
> But of coket, and clemantyne, or else clene wheate.'

This taste, however, was only to be indulged "when the new corn began to be sold;" for then a short season of plenty succeeded to a long period of fasting; the supply of corn was not equalized throughout the year by the provident effects of commercial speculation. The fluctuations in the price of grain, experienced during this period, and which were partly owing to insufficient agricultural skill, were sudden and excessive. On the securing of an abundant harvest in 1317, wheat, the price of which had been so high as 80*s*., fell immediately to 6*s*. 8*d*. per quarter. The people of those days seem always to have looked for a great abatement in the price of grain on the successful gathering of every harvest; and the inordinate joy of our ancestors at their harvest-home—a joy which is faintly reflected in our own times—proceeded, there is little doubt, from the change which the gathering of the crops produced, from want to abundance, from famine to fulness. That useful class of men who employ themselves in purchasing from the producers that they may sell again to the consumers, was then unknown in England. Immediately after the harvest, the people bought their corn directly from the farmers at a cheap rate, and, as is usual under such circumstances, were improvident in the use of it, so that the supply fell short before the arrival of the following harvest, and prices advanced out of all proportion.

The Reformation, and the discovery of America, were events that had a considerable influence upon the condition of the great body of the people in England. The one drove away the inmates of the monasteries, from whence the poor were accustomed to receive donations of food; the other, by pouring the precious metals into Europe, raised the price of provisions. In the latter half of the sixteenth century, wheat was three times as dear, both in England and France, as in the former half. The price of wheat, upon an average of years, varied very little for four centuries before the metallic riches of the New World were brought into Europe; upon an average of years it has varied very little since. The people of the days of Henry VIII. felt the change in the money-value of provisions, although the real value

remained the same; and they ascribed the circumstance to the dissolution of the monasteries. There is an old song of that day in the Somersetshire dialect, which indicates the nature of the popular error:—

"I'll tell thee what, good vellowe,
Before the vriars went hense,
A bushel of the best wheate
Was zold for vourteen pence;
And vorty eggs a penny
That were both good and newe;
And this, I say, myself have seen,
And yet I am no Jewe."

When wheat was fourteen-pence a bushel, it was probably consumed by the people, in seasons of plenty, and soon after harvest. During a portion of the year there is little doubt that the English labourers had better food than the French, who, in the fifteenth century, were described by Fortescue thus:—"Thay drynke water, thay eate apples, with bred right brown, made of rye." Locke, travelling in France, in 1678, says of the peasantry in his journal, "Their ordinary food, rye bread and water." The English always disliked what they emphatically termed "changing the white loaf for the brown." Their dislike to brown bread in some degree prevented the change which they proverbially dreaded. In the latter part of the sixteenth century, however, this change was pretty general, whatever was the previous condition of the people. Harrison says, speaking of the agricultural population, "As for wheaten bread, they eat it when they can reach unto the price of it, contenting themselves, in the mean time, with bread made of oates or barlie, a poore estate, God wot!" In another place, he says, "The bread throughout the land is made of such graine as the soil yieldeth; nevertheless, the gentilitie commonlie provide themselves sufficiently of wheate for their own tables, whilst their household and poore neighbours, in some shires, are inforced to content themselves with rye or barlie." Harrison then goes on to describe the several sorts of bread made in England at his day, viz. manchet, cheat, or wheaten bread; another inferior sort of bread, called ravelled; and lastly, brown bread. Of the latter there were two sorts: "One baked up as it cometh from the mill, so that neither the bran nor the floure are any whit diminished. The other hath no floure left therein at all; and it is not only the worst and weakest of all the other sorts, but also appointed in *old time* for servants, slaves, and the inferior kind of people to feed upon. Hereunto, likewise, because it is drie and brickle in the working, some add a portion of rie-meale in *our time*, whereby the rough drinesse thereof is somewhat qualified, and then it is named mescelin, that is, bread made of mingled corne." In the household book of Sir Edward Coke, in 1596, we find constant entries of oatmeal for the use of the house, besides "otmell to make the poore folkes porage," and "rie-meall, to make breade for the poore." The household wheaten bread was partly baked in the house and partly taken of the baker. In the same year it appears, from the historian Stow, that there was a great fluctuation in the price of corn; and he particularly mentions the price of oatmeal, which would indicate that it was an article of general consumption, as well in a liquid form as in that of the oatcakes of the north of England.

In 1626, Charles I., upon an occasion of subjecting the brewers and maltsters to a royal license, declared that the measure was "for the relief of the poorer sort of his people, whose usual bread was barley; and for the restraining of innkeepers and victuallers, who made their ale and beer too strong and heady." The grain to be saved by the weakness of the beer was for the benefit of the consumers of barley-bread.

At the period of the Revolution, (1689,) wheaten bread formed, in comparison with its present consumption, a small portion of the food of the people of England. The following estimate of the then produce of the arable land in the kingdom tends to prove this position. This estimate was made by Gregory King, whose statistical calculations have generally been considered entitled to credit.

	Bushels.
Wheat	14,000,000
Rye	10,000,000
Barley	27,000,000
Oats	16,000,000
Pease	7,000,000
Beans	4,000,000
Vetches	1,000,000
In all	79,000,000

At the commencement of the last century, wheaten bread became much more generally used by the labouring classes, a proof that their condition was improved. In 1725, it was even used in poor-houses, in the southern counties. The author of "Three Tracts on the Corn Trade," published at the beginning of the reign of George III., says, "It is certain that bread made of wheat is become much more generally the food of the common people since 1689 than it was before that time; but it is still very far from being the food of the people in general." He then enters into a very curious calculation, the results of which are as follow: "The whole number of people is 6,000,000, and of those who eat

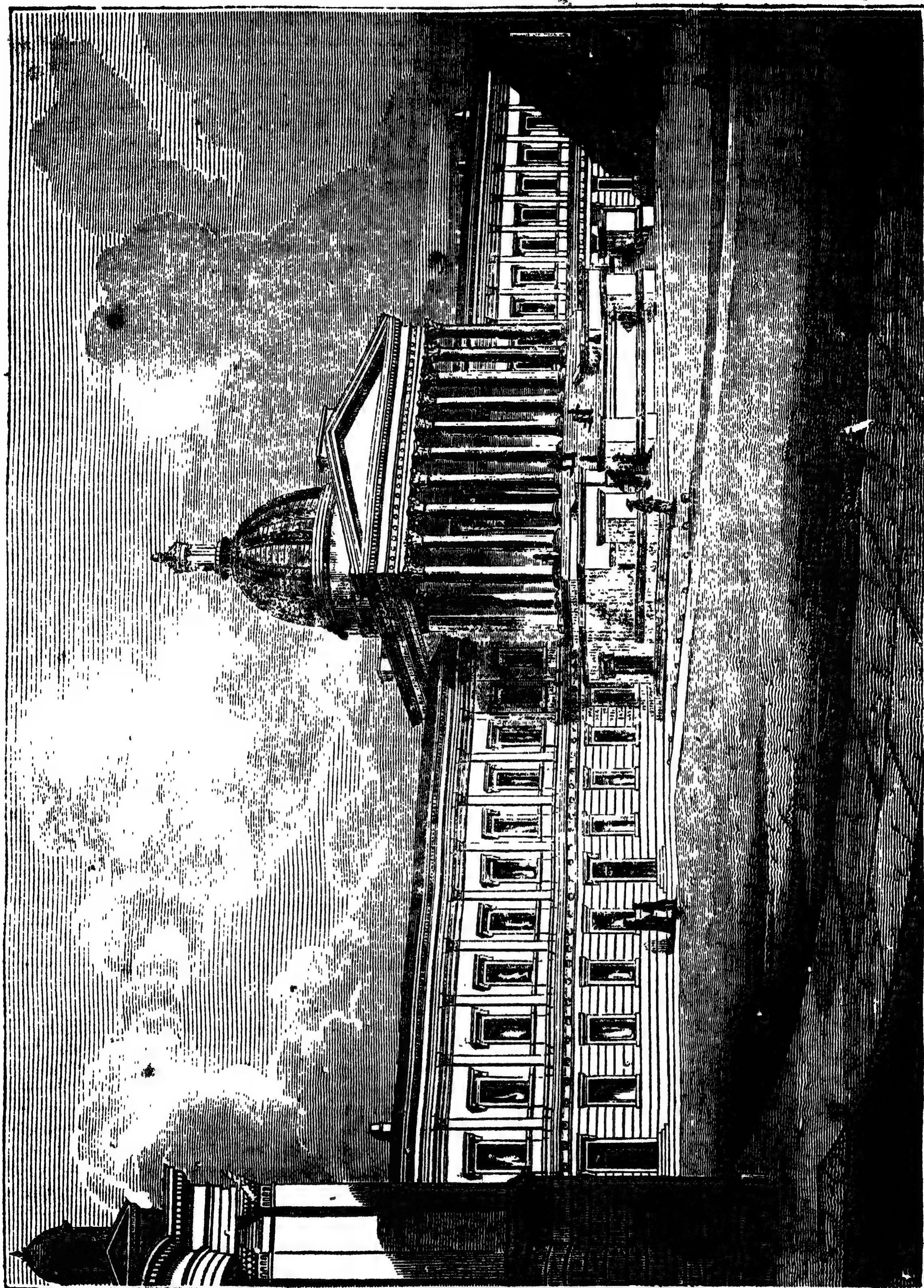
Wheat, the number is,	3,750,000
Barley	739,000
Rye	888,000
Oats	623,000
Total	6,000,000"

This calculation applies only to England and Wales. Of the number consuming wheat, the proportion assigned to the northern counties of York, Westmoreland, Durham, Cumberland, and Northumberland, is only 30,000. Eden, in his History of the Poor, says, "About fifty years ago, (this was written in 1797,) so small was the quantity of wheat used in the county of Cumberland, that it was only a rich family that used a peck of wheat in the course of the year, and that was used at Christmas. The usual treat for a stranger was a thick oatcake (called haver-bannock) and butter. An old labourer of eighty-five remarks that, when he was a boy, he was at Carlisle market with his father, and wishing to indulge himself with a penny loaf made of wheat-flour, he searched for it for some time, but could not procure a piece of wheaten bread at any shop in the town."

At the time of the Revolution, according to the estimate of Gregory King, 14,000,000 bushels of wheat were grown in England. In 1828, according to the estimate of Mr. Jacob, in his Tracts on the Corn Trade, 12,500,000 quarters, or 100,000,000 bushels, were grown. The population of England at the Revolution was under five millions, so that each person consumed about three bushels annually. The population, at the present time, is under fifteen millions, so that each person consumes about seven bushels annually.

Public Observatory.—A Correspondent, who signs himself "A Man of Kent," says, "Last week, for a shilling, I was able to make acquaintance with an aquatic world, whose existence I, till then, had never been aware of. The 'Hydro-oxygen Microscope' convinced me that a dewdrop may be as full of moving beings as Almack's. But I have been all my life—or half my life—that is, all the nights of it, desiring a nearer acquaintance with the stars; and I wish that my honest shilling could procure me admission to some observatory, where I could contemplate those enormous evidences of the Creator's power with as much ease as I did the minute atoms whose existence I had never known of before." The hint appears to us well worthy the attention of those who have capital and enterprise. We have little doubt that the prevailing desire for knowledge would render a cheap Observatory one of the most attractive objects in the metropolis.

THE UNIVERSITY OF LONDON.



[Principal Front of the University of London.]

THE preceding engraving presents a view of the handsome front of this University, being the centre façade of the entire building. The wings, which are to advance at right angles from each extremity, have not yet been erected. The portico with its ten Corinthian columns, and the dome springing from the vestibule, have great beauty. It is intended that the vestibules terminating the two wings shall each be surmounted by a dome, of smaller dimensions, but in other respects similar to that over the central portico.

An extensive piece of ground, at the north end of Gower Street, having been purchased for the sum of £30,000, and a contract having been made to finish the building for £107,000, according to the design furnished by Mr. Wilkins, the foundation-stone was laid on the 30th of April, 1827, by the Duke of Sussex, in the

presence of the Duke of Norfolk, the late Earl of Carnarvon, Lord Auckland, the present Lord Chancellor, the late Sir James Mackintosh, and others of the most distinguished individuals in the country for rank and talent. The mallet employed upon the occasion, it may be worth noticing, was the same which Wren had used in laying the foundation-stone of St. Paul's Cathedral, having been presented by the great architect to the Masonic Lodge of Antiquity, of which he was a member. The building, thus commenced, was carried on with extraordinary dispatch; and the central portion of it—all of the original design which it was intended to proceed with for the present—having been completed, the New University was formally opened on the 1st of October, 1828.

On this occasion an audience of from eight hundred to one thousand persons, who had been admitted by tickets, assembled in one of the large theatres of the building, when they were addressed in an introductory lecture on the subject of his course by Mr. (now Sir Charles) Bell, the Professor of Physiology and Surgery. Most of the members of the Council, and many other eminent public characters, were present. On the following day Dr. Conolly delivered his introductory lecture on the Nature and Treatment of Diseases; and he was followed on so many successive days by the Professors of Anatomy, of the Materia Medica, and of Chemical Medicine. Dr. Turner, the Professor of Chemistry, commenced his course on the 15th. The Classes of Science and General Education were opened on the 24th, by an introductory lecture from the Rev. T. Dale, on the English Language and Literature.

In looking back upon the progress of this Institution, it is most satisfactory to know that the foundation at least has been laid of an undertaking which seems to promise the most important results. In the new University, the business of instruction may be expected to be conducted in the spirit of the existing age, and with the aid of whatever improvements the advanced state of society has discovered. Here ought always to be obtained the best education which the country affords, or for which there is any demand. This Institution seems to be fitted to accompany the onward course of the general intelligence, and even to lead and accelerate its march. Already a second academic institution has been called into existence in the metropolis by its example. London, the chief centre both of population and of wealth in the kingdom, is now possessed of two Universities, having been but a few years ago almost the only capital of Europe which had not one. The vast multitude of its inhabitants can now have the best education for their sons in all the highest branches of learning, without sending them away from the moral shelter of the parental roof. This combination of the advantages of a public and academic education with those of domestic residence and guardianship, was one of the main objects contemplated in the original design of the London University; and a more important object could not have been contemplated with regard to the formation of character, moral and intellectual. Another was the establishment of schools of law and medicine, neither of which existed at Oxford or Cambridge. This latter object has been attended with remarkable success. The medical classes in particular have from the first been numerously attended; and while some other departments of the Institution have still to struggle with considerable difficulties and discouragements, these may be regarded as having already attained a remarkable degree of prosperity, and established themselves on a secure basis. The foundation of a Hospital, in connexion with the University, will not only afford the medical pupils every facility for that best instruction which is furnished by observation and experience, but will confer a great benefit on the inhabitants of that very populous district in which this Institution is situated.

A most important addition has also been made to the original design of the University, by the School, or Seminary of Elementary Instruction, which is now attached to it. This part of the establishment was opened in the beginning of last year, and the success of the experiment has equalled the most sanguine expectations that were formed of it. According to the arrangement which has been latterly adopted, the Professors of Latin and Greek in the University are the conductors or head-masters of the School. Associated with them are four assistant-masters in the classical department, together with teachers of French, of German, of English Elocution, of Mathematics and Arithmetic, of Book-keeping and Writing, and of Drawing. The period of attendance is five hours every day, except on Saturday, when it is only three hours.* Discipline is maintained without corporal chastisement—the extreme punishment for misconduct being dismissal from the school, which excludes the individual from the University.

LIBRARIES FOR WORKING MEN.

It affords us great pleasure to observe that, in several towns and villages, the mechanic and the labourer may now obtain useful and amusing books to read upon the payment of a very small subscription. Such institutions we have no doubt will become generally established. A "Public Library" of this open nature has been recently founded for the use of the people of Windsor and Eton; and Sir John Herschel, who unites to profound scientific attainments an ardent desire for the general diffusion of knowledge, is president of the institution. In the discharge of the duties of that office, he read an address to the subscribers to the library on the 29th of January last, which has just been published. This little tract is remarkable for its liberal and manly spirit, and its sound sense. In the conviction that it will be agreeable to the author that his benevolent views of the important subject of education should be widely disseminated, we shall venture to quote somewhat largely from this address.

After noticing the immense national importance of endeavouring to enforce the standard of moral and intellectual culture in the mass of the people, the President of the Windsor and Eton Public Library adverts to the regulations by which the books are accessible to the humbler classes. It appears that in this establishment there are two rates of subscription,—the one admitting the subscriber to a reading-room, furnished with newspapers and periodical works, and entitling him to the loan of the standard works of the library,—the other throwing open the library only to a humbler class. This is, no doubt, a judicious arrangement. Sir John Herschel regrets that the use of the library is not altogether gratuitous for certain readers. Of the prudence of such a plan we have considerable doubts. Experience has undeniably shown, that what is given away is often little prized by those who receive it; and, besides this, the payment of even a penny a week to a library makes the working man feel as independent as the wealthier subscriber. While his mind is being elevated by the process of acquiring knowledge, it must not be degraded by the feeling that others are paying for the means of his improvement.

It has always appeared to us that those who have little leisure for reading, and whose hour of leisure is often an hour of weariness, must be principally attracted to a book by the desire of amusement. Sir John Herschel has put this point so forcibly that we cannot refrain from giving his argument entire:—

"There is a want too much lost sight of in our estimate of the privations of the humbler classes, though it is one of the most incessantly craving of all our wants, and is actually the impelling power which, in the vast majority

of cases, urges men into vice and crime,—it is the want of amusement. It is in vain to declaim against it. Equally with any other principle of our nature, it calls for its natural indulgence, and cannot be permanently debarred from it, without souring the temper, and spoiling the character. Like the indulgence of all other appetites, it only requires to be kept within due bounds, and turned upon innocent or beneficial objects, to become a spring of happiness; but gratified to a certain moderate extent it must be, in the case of every man, if we desire him to be either a useful, active, or contented member of society. Now I would ask, what provision do we find for the cheap and innocent and daily amusements of the mass of the labouring population of this country? What sort of resources have they to call up the cheerfulness of their spirits, and chase away the cloud from their brow after the fatigue of a day's hard work, or the stupefying monotony of some sedentary occupation? Why, really very little—I hardly like to assume the appearance of a wish to rip up grievances by saying *how* little. The pleasant field walk and the village green are becoming rarer and rarer every year. Music and dancing (the more's the pity) have become so closely associated with ideas of riot and debauchery, among the less cultivated classes, that a taste for them for their own sakes can hardly be said to exist; and before they can be recommended as innocent or safe amusements, a very great change of ideas must take place. The beer-shop and the public-house, it is true, are always open, and always full, but it is not by *those* institutions that the cause of moral and intellectual culture is advanced. The truth is, that under the pressure of a continually condensing population, the habits of the city have crept into the village—the demands of agriculture have become sterner and more imperious; and while hardly a foot of ground is left uncultivated and unappropriated, there is positively not space left for many of the cheerful amusements of rural life. Now, since this appears to be unavoidable, and as it is physically impossible that the amusements of a condensed population should continue to be those of a scattered one, it behoves us strongly to consider of some substitutes. But perhaps it may appear to some almost preposterous to enter on the question. Why, the very name of a labourer has something about it with which amusement seems out of character. Labour is work, amusement is play; and though it has passed into a proverb that one without the other will make a dull boy, we seem to have altogether lost sight of a thing equally obvious—that a community of 'dull boys,' in this sense, is only another word for a society of ignorant, headlong, and ferocious men.

"I hold it, therefore, to be a matter of very great consequence, independent of the kindness of the thing, that those who are at their ease in this world should look about and be at some pains to furnish available means of harmless gratification to the industrious and well-disposed classes, who are worse provided for than themselves in every respect, but who, on that very account, are prepared to prize more highly every accession of true enjoyment, and who really want it more. To do so is to hold out a bonus for the withdrawal of a man from mischief in his idle hours—it is to break that strong tie which binds many a one to evil associates and brutal habits—the want of something better to amuse him,—by actually making his abstinence become its own reward.

"Now, of all the amusements which can possibly be imagined for a hard-working man, after his daily toil, or in its intervals, there is nothing like reading an entertaining book, supposing him to have a taste for it, and supposing him to have the book to read. It calls for no bodily exertion, of which he has had enough or too much. It relieves his home of its dullness and sameness, which, in nine cases out of ten, is what drives him out to the ale-house, to his own ruin and his family's. It transports him into a livelier, and gayer, and more diversified and interesting scene; and while he enjoys himself there, he may forget the evils of the present moment, fully as much as if he were ever so drunk, with the great advantage of finding himself the next day with his money in his pocket, or at least laid out in real necessaries and comforts for himself and his family,—and without a headache. Nay, it accompanies him to his next day's work, and if the book he has been reading be anything above the very idlest and lightest, gives him something to think of besides the mere mechanical drudgery of his every-day occupation,—something he can enjoy while absent, and look forward with pleasure to return to.

"But supposing him to have been fortunate in the choice of his book, and to have alighted upon one really good and of a good class. What a source of domestic enjoyment is laid open! What a bond of family union! He may read it aloud, or make his wife read it, or his eldest boy or girl, or pass it round from hand to hand. All have the benefit of it—all contribute to the gratification of the rest, and a feeling of common interest and pleasure is excited. Nothing unites people like companionship in intellectual enjoyment. It does more, it gives them mutual respect, and to each among them self-respect—that corner-stone of all virtue. It furnishes to each the master-key by which he may avail himself of his privilege as an intellectual being, to

> 'Enter the sacred temple of his breast,
> And gaze and wander there a ravished guest;
> Wander through all the glories of his mind,
> Gaze upon all the treasures he shall find.'

And while thus leading him to look within his own bosom for the ultimate sources of his happiness, warns him at the same time to be cautious how he defiles and desecrates that inward and most glorious of temples."

The best sorts of reading to be provided for the humbler classes are pointed out by Sir John Herschel with great felicity. We are well pleased to have so excellent an authority in support of the principle which we have endeavoured to bear in mind, that no distinctions ought to be made between the reading for one class of the community and the reading for another class. The patronizing, condescending style in which the working-people are to be addressed is, we trust, worn out. Perspicuous thoughts, expressed in the clearest language,—this is the best definition of a good style, whether for the rich or the poor. The address before us puts this point very forcibly :—

"If then we would generate a taste for reading, we must, as our only chance of success, begin by pleasing. And what is more, this must be not only the ostensible, but the real object of the works we offer. The listlessness and want of sympathy with which most of the works written expressly for circulation among the labouring classes are read by them, if read at all, arises mainly from this—that the story told, or the lively or friendly style assumed, is *manifestly* and *palpably* only a cloak for the instruction intended to be conveyed,—a sort of gilding of what they cannot well help fancying must be a pill, when they see so much and such obvious pains taken to wrap it up.

"But try it on the other tack. Furnish them liberally with books not written expressly for them as a class—but published for their betters (as the phrase is), and those the best of their kind. You will soon find that they have the same feelings to be interested by the varieties of fortune and incident,—the same discernment to perceive the shades of character,—the same relish for striking contrasts of good and evil in moral conduct, and the same irresistible propensity to take the good side—the same perception of the sublime and beautiful in nature and art, when distinctly placed before them by the

touches of a master—and, what is most of all to the present purpose, the same desire, having once been pleased, to be pleased again. In short, you will find that in the higher and better class of works of fiction and imagination duly circulated, you possess all you require to strike your grappling-iron into their souls, and chain them, willing followers, to the car of advancing civilization.

"When I speak of works of imagination and fiction, I would not have it supposed that I would turn loose among the class of readers to whom I am more especially referring, a whole circulating library of novels. The novel, in its best form, I regard as one of the most powerful engines of civilization ever invented—but not the foolish romances which used to be the terror of our maiden aunts; not the insolent productions which the press has lately teemed with under the title of fashionable novels—nor the desperate attempts to novelize history which the herd of Scott's imitators have put forth, which have left no epoch since the creation untenanted by modern antiques, and no character in history unfalsified;—but the novel as it has been put forth by Cervantes and Richardson, by Goldsmith, by Edgeworth, and Scott. In the writings of these and such as these, we have a stock of works in the highest degree enticing and interesting, and of the utmost purity and morality—full of admirable lessons of conduct, and calculated in every respect to create and cherish that invaluable habit of resorting to books for pleasure. Those who have once experienced the enjoyment of such works will not easily learn to abstain from reading, and will not willingly descend to an inferior grade of intellectual privilege—they have become prepared for reading of a higher order—and may be expected to relish the finest strains of poetry, and to draw with advantage from the purest wells of history and philosophy. Nor let it be thought ridiculous or overstrained to associate the idea of poetry, history, or philosophy, with the homely garb and penurious fare of the peasant. How many a rough hind, on Highland hills, is as familiar with the 'Paradise Lost,' or the works of his great national historians, as with his own sheep-hook! Under what circumstances of penury and privation is not a high degree of literary cultivation maintained in Iceland itself—

'In climes beyond the solar road,
Where savage forms o'er ice-built mountains roam;
The muse has broke the twilight gloom
To cheer the shivering native's dull abode!'

And what is there in the character or circumstances of an Englishman that should place him, as a matter of necessity, and for ever, on a lower level of intellectual culture than his brother Highlander, or the natives of the most inhospitable country inhabited by man? At least, there is always this advantage in aiming at the highest results—that the failure is never total, and that though the end accomplished may fall far short of that proposed, it cannot but reach far in advance of the point from which we start. There never was any great and permanent good accomplished but by hoping for and aiming at something still greater and better."

We add one or two detached passages from this excellent tract:—

Village Enthusiasm.—"I recollect an anecdote told me by a late highly-respected inhabitant of Windsor as a fact which he could personally testify, having occurred in a village where he resided several years, and where he actually was at the time it took place. The blacksmith of the village had got hold of Richardson's novel of 'Pamela, or Virtue Rewarded,' and used to read it aloud in the long summer evenings, seated on his anvil, and never failed to have a large and attentive audience. It is a pretty long-winded book—but their patience was fully a match for the author's prolixity, and they fairly listened to it all. At length, when the happy turn of fortune arrived, which brings the hero and heroine together, and sets them living long and happily according to the most approved rules—the congregation were so delighted as to raise a great shout, and procuring the church keys, actually set the parish bells ringing. Now let any one say whether it is easy to estimate the amount of good done in this simple case. Not to speak of the number of hours agreeably and innocently spent—not to speak of the good-fellowship and harmony promoted—here was a whole rustic population fairly won over to the side of good—charmed—and, night after night, spell-bound within that magic circle which genius can trace so effectually, and compelled to bow before that image of virtue and purity which (though at a great expense of words) no one knew better how to body forth with a thousand life-like touches than the author of that work."

A Taste for Reading.—"If I were to pray for a taste which should stand me in stead under every variety of circumstances, and be a source of happiness and cheerfulness to me through life, and a shield against its ills, however things might go amiss, and the world frown upon me, it would be a taste for reading. I speak of it of course only as a worldly advantage, and not in the slightest degree as superseding or derogating from the higher office and surer and stronger panoply of religious principles—but as a taste, an instrument, and a mode of pleasurable gratification. Give a man this taste, and the means of gratifying it, and you can hardly fail of making a happy man, unless, indeed, you put into his hands a most perverse selection of books. You place him in contact with the best society in every period of history, with the wisest, the wittiest, with the tenderest, the bravest, and the purest characters who have adorned humanity. You make him a denizen of all nations,—a cotemporary of all ages. The world has been created for him. It is hardly possible but the character should take a higher and better tone from the constant habit of associating in thought with a class of thinkers, to say the least of it, above the average of humanity. It is morally impossible but that the manners should take a tinge of good-breeding and civilization from having constantly before one's eyes the way in which the best-bred and the best-informed men have talked and conducted themselves in their intercourse with each other. There is a gentle, but perfectly irresistible coercion in a habit of reading, well directed, over the whole tenor of a man's character and conduct, which is not the less effectual because it works insensibly, and because it is really the last thing he dreams of. It cannot, in short, be better summed up, than in the words of the Latin poet—

'Emollit mores, nec sinit esse feros.'

It civilizes the conduct of men, and suffers them not to remain barbarous."

Deer Hunting by American Indians.—In the great plains between Oakinagan and Spokan there are at particular seasons numbers of small deer. The editor of Lewis and Clarke classes them as antelopes; but how much soever they may resemble those animals in swiftness and shape, their horns, as described by naturalists, are totally different. Their flesh is sweet and delicate, and they generally go in small herds. Towards the latter end of the summer they are in prime condition, and at that season we had some excellent sport in hunting them. The Indians, however, are not satisfied with our method of taking them in detail. On ascertaining the direction the deer have chosen, part of their hunters take a circuit in order to arrive in front of the herd, while those behind set fire to the long grass, the flames of which spread with great rapidity. In their flight from the devouring element they are intercepted by the hunters, and, while they hesitate between these dangers, great numbers fall by the arrows of the Indians.—*Ross Cox's Adventures on the Columbia River.*

THE CASSOWARY.



[Cassowaries.]

THE wood-cut adjoined to this article represents the male cassowary, and has been drawn from specimens in the Surrey Zoological Gardens. This scarce and remarkable bird (the *Struthio Casuarius* of Linnæus) is found in India, and the most eastern part of the old continent. Even in its native regions it is uncommon; and few are domesticated. The habitual dulness of these birds, their disagreeable voice, and their hard, black flesh, offer no compensation for the cost of rearing and supporting them. The wild cassowary feeds on fruits, tender roots, and occasionally on the young of small animals. The tame are fed not only on fruits, but on bread, of which they consume about four pounds a-day. They run very swiftly, and often outstrip the fleetest horses. They resist dogs by dealing them severe blows with their feet. The male bird generally leaves his mate to the cares of incubation, which are required only at night; for during the day, their three greyish eggs, spotted with green, are exposed to the vivifying effects of the sun, being slightly covered with sand in the hole where they have been laid. In captivity, their incubation lasts eight and twenty days. The first cassowary ever seen in Europe was brought by the Dutch in 1597.

The head of the cassowary is almost bare, covered with a bluish skin, out of which grow a few scattered hairs. It is crowned with a conical helmet, brown in front and yellow in other parts; this helmet is formed by the swelling of the skull-bones. The throat is overspread with spongy glandular membranes, of a red and violet colour, which hang down in front. The body is covered with feathers of a bluish-black, of a particular character, somewhat similar to long thin hair. The feather of the wing, or what represents the wing, for it is not made for flight, consists of five hollow pipes, free from hair, and red towards the bottom.

The whole length, from the beak to the rump, of the full-grown bird, is rather more than five feet. The young bird has no helmet, and his plumes are of a light red colour, mixed with grey.

Novel Exhibition.—A Correspondent informs us that a very beautiful brass model of a steam-engine has been exhibited at the late Bristol September Fair, which sets in motion a miniature exhibition of the whole process of silk manufacture, from the winding the silk from the cocoon to its final weaving in the loom. The boiler and machine were on the outside of the caravan. The exhibition attracted the greatest notice, both on account of the novelty of the attempt, and the beautiful ease and regularity of its motions. Our Correspondent adds,—"My motive for mentioning this circumstance, which may seem trifling to those who are accustomed to the many novelties which a large and long-continued fair exhibits, is to commend the good sense of the individuals who thus introduced before the noisy crowds who frequent such places, a model, the original of which has produced such wonderful changes in the conditions of almost all nations. Should the exhibition of mechanical and philosophical apparatus become general at our fairs, it is to be hoped that the passion for trifling amusements will be changed into a relish for higher gratifications of curiosity."

⁎ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

LONDON:—CHARLES KNIGHT, 22, LUDGATE STREET, AND 13, PALL-MALL EAST.

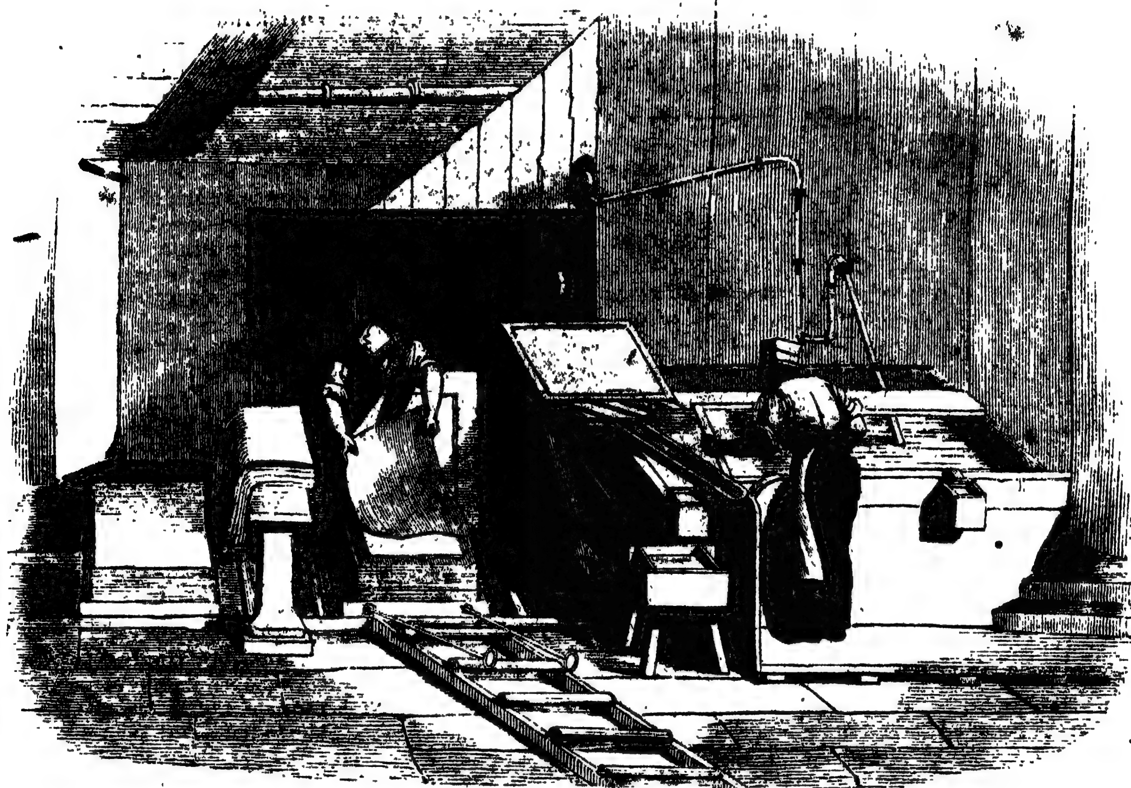
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THE COMMERCIAL HISTORY OF A PENNY MAGAZINE.—No. I.

INTRODUCTION.



[Paper Making, by Hand.]

William Caxton, the first English printer, at the end of the first book which he printed, uses the following remarkable words:—

"Thus end I this book, which I have translated after mine author, as nigh as God hath given me cunning; to whom be given the laud and praising. And forasmuch as in the writing of the same my pen is worn, mine hand weary and not stedfast, mine eyes dimmed with overmuch looking on the white paper, and my courage not so prone and ready to labour as it hath been, and that age creepeth on me daily and feebleth all the body; and also because I have promised to divers gentlemen and to my friends to address to them as hastily as I might this said book: Therefore I have practised and learned, at my great charge and dispense, to ordain this said book in print, after the manner and form as ye may here see. And (it) is not written with pen and ink as other books be; to the end that every man may have them at once. For all the books of this story, named the 'Recule of the Histories of Troyes,' thus imprinted as ye here see, were begun in one day, and also finished in one day*."

In this passage we find most of the conditions expressed which mark the superiority of the invention of printing over the old mode of multiplying books by the pen. The transcriber of a manuscript had to contend with the weary hand and the dim eye; he could not satisfy the wishes of "divers gentlemen" by producing his book "hastily;" and, above all, he could not meet the instant demand for copies of an admired production, by allowing every man to "have them at once." The slow process by which he worked was necessarily an expensive process: and thus the written books were immoderately dear; and so much importance was attached to them as property, that in many cases a volume was conveyed from the seller to the purchaser by legal assignment. On the contrary the printer, after certain processes had been gone through which were equivalent to the labours of transcribing three or four copies, could produce as many books as he pleased; and as far as taking off the impressions was concerned (to which the old printers peculiarly applied the name of their art), a small book, such as that first printed by Caxton, might be "begun in one day, and also finished in one day."

The process of printing, when compared with that of writing, is unquestionably a cheap process; provided a sufficient number of copies of any particular book are printed, so as to render the proportion of the first expense upon a single copy inconsiderable. If, for example, it were required, even at the present time, to print a single copy, or even three or four copies, ou

* Ames' Typographical Antiquities, by Herbert. We have changed the old orthography of the passage.

any production, the cost of printing would be greater than the cost of transcribing. It is when hundreds, and especially thousands, of the same work are demanded that the great value of the printing press in making knowledge cheap, is particularly shown. It is probable that the first printers did not take off more than two or three hundred, if so many, of their works; and, therefore, the earliest printed books must have been still dear, on account of the limited number of their readers. Caxton, as it appears by a passage in one of his books, was a cautious printer; and required something like an assurance that he should sell enough of any particular book to repay the cost of producing it. In his "Legends of Saints" he says, "I have submysed (submitted) myself to translate into English the 'Legend of Saints,' called 'Legenda aurea' in Latin; and William, Earl of Arundel, desired me—and promised to take a reasonable quantity of them—and sent me a worshipful gentleman, promising that my said lord should during my life give and grant to me a yearly fee, that is to note, a buck in summer and a doe in winter." Caxton, with his sale of a reasonable quantity, and his summer and winter venison, was more fortunate than others of his brethren, who speculated upon a public demand for books, without any guarantee from the great and wealthy. Sweynheim and Pannartz, Germans who settled in Rome, and there printed many beautiful editions of the Latin Classics, presented a petition to the Pope, in 1471, which contains the following passage:—"We were the first of the Germans who introduced this art, with vast labour and cost, into your holiness' territories, in the time of your predecessor; and encouraged, by our example, other printers to do the same. If you peruse the catalogue of the works printed by us, you will admire how and where we could procure a sufficient quantity of paper, or even rags, for such a number of volumes. The total of these books amounts to 12,475,—a prodigious heap,—and intolerable to us, your holiness' printers, by reason of those unsold. We are no longer able to bear the great expense of house-keeping, for want of buyers; of which there cannot be a more flagrant proof than that our house, though otherwise spacious enough, is full of quire-books, but void of every necessary of life." For some years after the invention of printing, many of the ingenious, learned, and enterprising men who devoted themselves to the new art which was to change the face of society, were ruined, because they could not sell cheaply unless they printed a considerable number of a book; and there were not readers enough to take off the stock which they thus accumulated. In time, however, as the facilities for acquiring knowledge which printing afforded created many readers, the trade of printing books became one of less general risk; and dealers in literature could afford more and more to dispense with individual patronage, and rely upon the public demand. After the experience of three centuries and a half, the power of reading has become so generally diffused, that a work like the "Penny Magazine," which requires a sale of 60,000 or 70,000 copies, before any profit can accrue, may be undertaken, with a reliance alone upon the general demand arising out of the extended desire of knowledge. The periodical sale of 160,000 copies of this work is the extreme point which literature has yet reached, in contrast with the promise of the Earl of Arundel to our first printer, to take of him a reasonable quantity of copies, and give him a buck and a doe yearly.

It has been said, that "the bent of civilization is to make good things cheap." There can be no doubt whatever, that in all the processes in which science is applied the article produced is not only made better but cheaper; and the more "the bent of civilization" leads to an extension of demand, the more will scientific knowledge, and the division of labour, be called into employment. But this is peculiarly the case in all *copying* processes, among which printing is the foremost. If a medal be executed for the use of one person only,—that is, if the whole expense of making the die be borne by one impression from the die,—the cost of one medal must be very great. But if many thousand copies of that medal be required, as was the case when the British soldiers who had been present at the victory of Waterloo each received a medal, the cost of the die, as apportioned to each medal, is scarcely anything. Now, instead of the die being executed in an inferior manner, when twenty thousand impressions are to be taken from it, it is probable that the workmanship will be very superior to that of the die which is only to produce one medal; for the co-operation of numbers allows a larger sum to be expended in the first cost of the die, without the price of each impression being sensibly affected by that cost. It is the same with the copying process of printing. The cost of authorship, of designs for wood-cuts, and of the wood-cuts themselves, of the "Penny Magazine," for example, required to produce a yearly volume, amounts, in round numbers, to 3,000*l*., or 60,000 shillings. If 120,000 copies are sold, that expence is sixpence upon each volume; if 60,000, one shilling; if 10,000, six shillings; if 3,000, one pound. The purchasers, therefore, of a twelvemonths' numbers of the "Penny Magazine," for which less than four shillings is paid to the publisher, buy not only sixty-four sheets of printed paper, but as much labour of literature and art as would cost a pound if only 3,000 copies were sold, and six shillings if only 10,000 were sold. Those, therefore, who attempt to persuade the public that cheap books must *essentially* be bad books, are very shallow or very prejudiced reasoners. The complete reverse is the truth. The cheapness ensures a very large number of purchasers; and the larger the number the greater the power of commercially realizing the means for a liberal outlay upon those matters in which the excellence of a book chiefly consists,—its text, and its illustrations. It is no doubt true that some cheap books must incidentally be bad books. That will be the case, if the condition of great cheapness is attempted with the probability of a small demand. Under such circumstances, the book must either be worthless, or the publishers must sustain severe loss. In cheap publications, the great object to be aimed at, is *certainty* of sale; and that certainty can only be attained by carrying the principle of excellence as far as can be compatible with commercial advantage. The first element of this certainty is an adequate demand.

The almost universal circulation of our "Penny Magazine" in the United Kingdom; its republication in the United States of America; the establishment of works of similar character, (in all respects imitations,) in France, Belgium, Germany, and Russia; and the plans already formed and announced for extending such publications to Italy, Holland, Poland, and the Brazils,—these circumstances have led us to think that a popular account of all the processes necessary for its production would be of very general interest. It is, therefore, our intention to devote the present Supplement, and the three following Supplements, to this undertaking. About twenty wood-cuts will be employed in illustrating the subject.

SECTION 1.—PAPER MAKING.

IN the petition of Sweynheim and Pannartz to the Pope, which we have already quoted, one passage shows that the demand for paper, which had been created by the new art of printing, was supplied with difficulty. "If you peruse the catalogue of the works printed by us, you will admire how and where we could procure a sufficient quantity of paper, or even rags, for such a number of volumes." The total of their books amounted to 12,475

volumes. If we average each volume at 50 sheets, of the same size as the "Penny Magazine," (which is indeed the size of the early folios,) we find that the quantity of paper thus printed upon was about 1250 reams. Now, this is as near as may be the quantity required for three numbers only of the "Penny Magazine;" or one twentieth of the quantity annually consumed in printing sixty-four numbers. In weight the quantity for our annual consumption amounts to 500,000 lbs. But then the total annual production of first class paper (that is, writing and printing paper), in the United Kingdom, is about 50,000,000 lbs., or about 100 times as much as that used for the "Penny Magazine," and more than 2000 times as much as the paper used in the 12,475 volumes of the poor German printers. It is not unlikely, therefore, that some of our readers may admire how and where *we* can now procure a sufficient quantity of rags for such an immense production of printing and writing paper. We will endeavour to explain how this is managed.

The material of which the sheet of paper which the reader now holds in his hand is formed, existed, a few months ago, perhaps in the shape of a tattered frock, whose shreds, exposed for years to the sun and wind, covered the sturdy loins of the shepherd watching his sheep on the plains of Hungary;—or it might have formed part of the coarse blue shirt of the Italian sailor, on board some little trading vessel of the Mediterranean;—or it might have pertained to the once tidy *camicia* of the neat straw-plaiter of Tuscany, who, on the eve of some festival, when her head was intent upon gay things, condemned the garment to the *stracci-vendolo** of Leghorn; or it might have constituted the coarse covering of the flock bed of the farmer of Saxony, or once looked bright in the damask table-cloth of the burgher of Hamburgh;—or, lastly, it might have been swept, new and unworn, out of the vast collection of the shreds and patches, the fustian and buckram, of a London tailor,—or might have accompanied every revolution of a fashionable coat in the shape of lining—having travelled from St. James's to St. Giles's—from Bond Street to Monmouth Street—from Rag Fair to the Dublin Liberty—till man disowned the vesture, and the kennel-sweeper claimed its miserable remains†. In each or all of these forms, and in hundreds more which it would be useless to describe, this sheet of paper a short time since might have existed. The rags of our own country do not furnish a fifth part of what we consume in the manufacture of paper. (France, Holland, and Belgium prohibit, under severe penalties, the exportation of rags, because they require them for their own long-established manufactories.) Spain and Portugal also prohibit their exportation. Italy and Germany furnish the principal supplies of linen rags, both to Great Britain and the United States. They are exported from Bremen, Hamburgh, Rostock, Ancona, Leghorn, Messina, Palermo, and Trieste. They arrive in our ports in closely packed bags, containing each about four hundred-weight, which, according to the respective qualities of the rag, are marked SPFF, SPF, FF, FX, and FB. There are many varieties of rag even in these divisions; and their qualities are pretty clear indications of the state of comfort and cleanliness in particular districts and countries. The linen rags of England are generally very clean, and require little washing and no bleaching, before they are ground into pulp;—the Italian rags, on the contrary, are originally so dirty, that they are washed in lime before they are fit for the foreign market. The greater portion of the rags from the north of Europe are so dark in their colour and so coarse in their texture, that it is difficult to imagine how they could have formed part of any inner garments; while those, on the other hand, which are collected at home, evidently belong to a people who are clothed in "fine linen" every day.

In a rightly-managed paper-mill no substance but rags enters into the composition of first-class paper. Dishonest manufacturers have, indeed, employed plaster of Paris in large quantities; but we believe the practice is very generally discontinued. Many experiments have been made upon substances proposed as substitutes for rags in the manufacture of paper. The bark of the willow, the beech, the aspen, the hawthorn, and the lime, have been made into tolerable paper; the tendrils of the vine, and the stalks of the nettle, the mallow, and the thistle, have been used for a similar purpose; the bine of our own hops, it is affirmed, will produce paper enough for the use of England; and several patents have been granted for making paper of straw. The process of bleaching the coarser rags, so as to render them fit for the purposes to which only those of the finest qualities were formerly applied, will, however, render the use of these inferior substances unnecessary for many years. But the time may probably come when we shall obtain no rags from other countries. The advance of a people in civilization has not only a tendency to make the supply of rags abundant, but, at the same time, to increase the demand for rags. The use of machinery in manufactures renders clothing cheap; the cheapness of clothing causes its consumption to increase, not only in the proportion of an increasing population, but by the scale of individual expenditure; the stock of rags is therefore increasing in the same ratio that our looms produce more linen and cotton cloth. But then the increase of knowledge runs in a parallel line with this increase of comforts; and the increase of knowledge requires an increase of books. The principle of publishing books and tracts, to be read by thousands instead of tens and hundreds, has already caused a large addition to the demand for printing-paper. In 1829 the excise-duty on paper amounted to £728,000; in 1832 to £815,000. If, therefore, the demand for books, not only in England but in all civilized countries, should outrun, which it is very likely to do, the power of each individual to wear out linen and cotton clothing to supply the demand, paper must be manufactured from other substances than rags.

The paper upon which the "Penny Magazine" is printed is chiefly manufactured at Albury Mill, near Guildford, belonging to Mr. Magnay. Paper-mills in the south of England are set in motion by water-power,—that is, they are placed upon some small stream, which, being dammed up, sets the wheels in motion, as in a flour-mill. In the north of England, where coal is abundant, paper-mills employ steam-power; and in the present mode of manufacturing paper, in which heat is essential, it is probable that the article can be produced at a lower rate by this process. A paper-mill, moved by water-power, is generally a very agreeable object. It is in most instances situated in some pretty valley, through which the little river glides;—and as it is important that the water, (which is not only employed for turning the wheels, but for converting the rags into pulp,) should be of the purest quality, the stream is generally one of those transparent ones which are so common in England—now bubbling over pebbly shallows, and now sleeping in quiet depths. The paper-mill at Albury is of this picturesque character. We think it better to describe the process of paper-making as we saw it at this mill, than to adopt a more general description, which might appear to have less reality about it.

The first process is strangely in contrast with the general appearance of cleanliness which distinguishes a

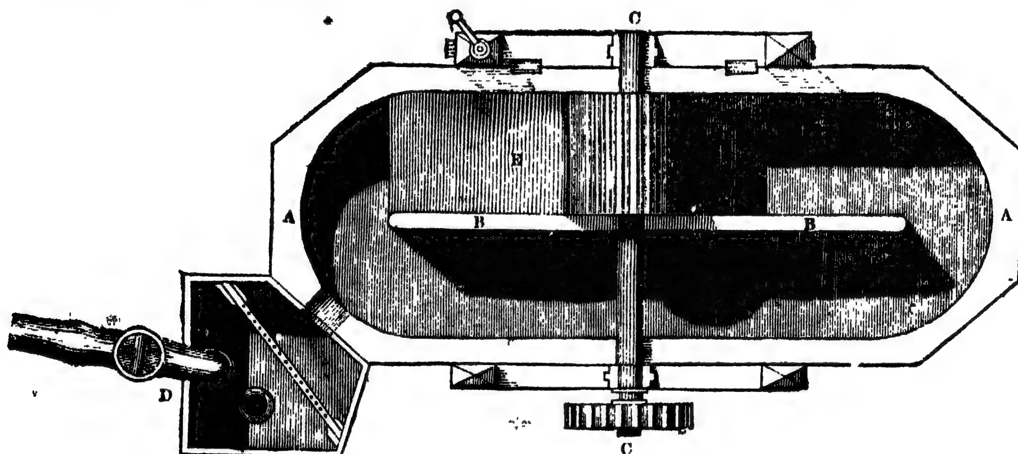
* Rag-merchant. The rags of Italy, as well as of other countries, are collected by travelling dealers, who convey them to the depositories in the towns.

† The *chiffonniers* (rag-dealers) of Paris rose against the police, a year or two ago, because it was ordered, in certain municipal regulations, that the filth of the streets should be taken away in carts, without time being allowed for its examination by those diligent savers of capital.

paper-mill. In a long room, filled with dust, are some twenty or thirty women employed in sorting and cutting rags. Each woman stands at a frame, or table, whose top is covered with wire: on her left is a quantity of rags; on her right a box divided into three compartments. On a part of the table an upright knife, about a foot long, is fixed. This formidable instrument looks like the broken blade of a scythe, and we believe it is so. It is the business of the woman to sort and cut the rags. She spreads a few on the wire frame before which she stands; and as she shakes them a great deal of the dirt passes through the wire to a box beneath. If the pieces are small enough,—and they are required not to be larger than three or four inches square,—she throws each piece into one of the compartments of the box on her right, according to its quality. If a piece requires to be cut, she draws it across the blade of the knife, by which it is instantly divided. She is particularly careful to put all seams by themselves; for the sewing thread, if not thoroughly ground, would produce filaments in the paper. These operations are performed with great rapidity. An active workwoman can sort and cut about a hundred-weight a day. When cut and sorted the rags are weighed, and removed in bags containing each a hundred-weight.

In looking at the operations of the rag-room, the first impression of the visitor is, that the rags which he sees are for the manufacture of the coarse brown paper which is used for so many commercial purposes. He cannot believe that the dingy bits of linen cloth, many of them originally of the colour of a sack, and others so dirty as to appear as incapable of being purified as the blood-spotted hand of Macbeth's wife, should become that beautiful fabric, a sheet of white paper. But so it is. This wonderful change is gradually brought about by very certain and simple processes. We leave the sorting-room, and are conducted to a shed, in which there are several large square chests filled with rags. We see the muddy-looking mass heaving up and somewhat agitated. Steam is being admitted into the chests; and here they are boiled with lime for a few hours. At the end of that period they are still very discoloured; but the inexperienced observer begins to have hopes that they may at least serve for *whited-brown* paper. From the washing shed we are conducted into an upper room in the mill We hear a deafening noise, and see that it is produced by the movements of a large horizontal wheel, which is connected with several oval cisterns, or troughs, about ten feet long, and four or five feet broad. These troughs, and the machinery within them, are technically called *Engines*: their uses are most important in the manufacture. Previous to their introduction into this country, which was about sixty years ago, the rags were first washed by hand;—then placed wet in close vessels till they became half-rotten;—and after the fibre was thus nearly destroyed, they were reduced to pulp, either by hammers in a mortar, or by a cylinder grinding against the sides of a circular wooden bowl. All these operations were slow and expensive, and very destructive of material. In these engines, which wash, tear, and beat the rags, every particle is preserved; and the whole process, by the aid of machinery in making the sheet, is so rapid, that a bag of rags may easily leave the port of Hamburgh on the first of September, and be converted into paper—nay printed upon and distributed through the United Kingdom in the form of a "Penny Magazine"—by the first of October.

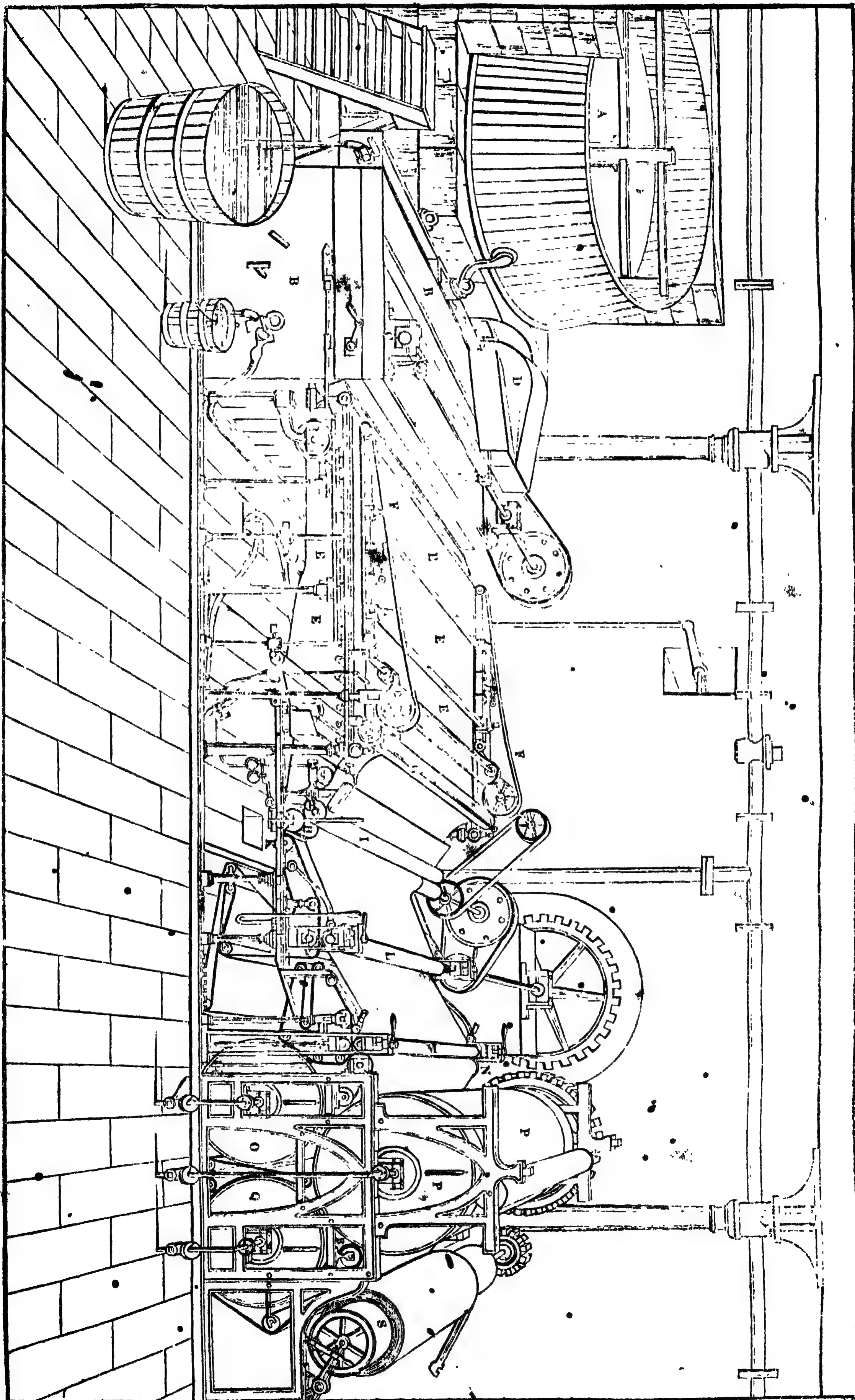
Into one of these engines, then, the boiled rags are first placed to be washed. If the white linen rags of England only are used, they are not boiled, but are at once placed in the washing engine. The following wood-cut may assist the description:—



A is the trough, ten feet long, four and a half feet broad, and two and a quarter feet deep. It is made of wood, lined with lead. B is a longitudinal division of the engine; C is an iron-roller, twenty-two inches in diameter, and twenty-six inches wide. D is an apparatus for conveying pure water into the trough, and for carrying off the foul water. The roller being set in motion, about a hundred-weight of rags are put into the trough, and as much water is let in as will raise the whole to within an inch or two of the brim. The roller is not a plain cylinder, but its surface presents a number of bars, or knives, projecting more than an inch radially from its axis; and beneath the roller is a plate composed of bars, or knives, of the same kind as those of the roller. When the roller commences its revolutions, of which it makes about 160 in a minute, the rags are carried with great rapidity through the knives; and as the roller is depressed upon the plate, or elevated, are the rags drawn out, or bruised, or cut, as may be required. Above the roller is a cover, (not shown in the cut,) in which are two frames of wire cloth, communicating with the pipes at D. When, therefore, the whole mass is in agitation, the rags, after passing through the knives of the roller and the plate, are carried up the inclined plane of the division E; and the foul water, passing through the frames, is removed by a pipe at D, while a clear stream is continually pouring in from the same point. In this way the rags are bruised down, and washed, in the first engine. After this operation has been continued for a sufficient time, the water is let off; and the cleansed mass is removed to a press, for the purpose of driving out the greater part of the water which remains in it. In this state, the foreign rags, though not white, are clean, and have somewhat the colour of the cloth called brown holland. The visitor has now hopes that something like white paper may be produced from them.

The discoveries of modern chemistry have assured to us

the perfect completion of these hopes. The process of bleaching reduces every description of linen rag to an uniform whiteness; and if the operation is properly conducted, the quality of the fabric is uninjured. The rags,



REFERENCES TO THE PARTS OF THE MACHINE.—A Chest.—B Vat, 4 feet by 5.—C Sifter.—D Lifter.—E Endless wire, 5 feet wide.—F Deckel straps.—G Dandy, a wire cylinder.—H Lower roller of endless wire.—I Roller pressing upon H.—K First roller to the endless felt.—L First pair of pressing rollers.—M Second pair of pressing rollers.—N Roller receiving the sheet previous to its coming upon O.—O First hot cylinder.—P Second hot cylinder.—Q Third hot cylinder.—R Felted Cylinder.—S Ree.

being removed from the press, are placed in a receiver or chamber made of wood, from which the external air is carefully excluded. Into this chamber are conveyed pipes, communicating with a retort, in which chlorine is formed, by the application of heat to a due proportion of manganese, common salt, and sulphuric acid. This part of the process is completed in a few hours. The rags are now white; but they have an intolerable smell. The subsequent operations of washing and bruising entirely purify them.

From the gas chamber the rags are again conveyed to the washing-engine. In this they are driven round as before, till the chlorine is thoroughly forced out of them. They are then let off into the beating-engine. This is of the same construction as the washing-engine, except that the knives of the roller and the plate are closer together. The roller here is moved with more rapidity. In the washing-engine the motion of the rollers produces a harsh growling sound—in the beating-engine the noise is that of a loud humming, which is not unpleasant. Having been ground for several hours in this machine, the rags assume the beautiful appearance of pulp. In this state the preparation somewhat resembles milk. In this engine, the *size*, which is prepared from pieces of sheep-skins, and other animal substances, is sometimes introduced. In writing paper the size is applied after the sheet is made.

From the last engine the pulp, now completely ready to be formed into paper, is conveyed by a valve to the chest. This is a large circular vessel which will contain several engines full of pulp, technically called *stuff*. The chest which we shall presently describe in connexion with the *paper-machine*, is twelve feet in diameter by five in depth. An *agitator* constantly revolves round it, by which the stuff is kept from sinking.

We are now arrived at that stage of the process in which the sheet of paper is to be formed out of the stuff thus prepared. In some cases the sheet is made by hand in a mould; in others by machinery. The paper of our "Magazine" is, like most other printing-paper, made by the machine. But as a great deal of paper is still made by hand, it will be right that we should briefly describe that operation.

The wood-cut at the commencement of this Number represents the process of making paper by hand. The drawing was made at the celebrated Turkey Mill of Messrs. Hollingworth, near Maidstone.

Upon looking at the cut it will be seen that one of the two men employed is dipping a sort of frame into a vat. This vat is supplied with *stuff* from the chest already described; and that stuff is kept warm by a copper within the vat, to which heat is communicated by a steam-pipe. It is also agitated by machinery within. The workman forming the sheet, who is called a vatman, is provided with two moulds. These are slight frames of wood, covered with fine wire. Fitting to each mould is a deckel, or moveable raised edging, which determines the size of the sheet. The vatman, putting the deckel on one of the moulds, dips it vertically into the stuff; and bringing it to the surface horizontally, covered with pulp, shakes it gently. It must be evident that this operation requires the greatest nicety, both in determining the general thickness of the sheet, and in producing it of an uniform thickness throughout. The vatman then pushes the mould with the sheet towards his fellow workman, who is called the coucher; and, taking off the deckel, applies it to the second mould, and proceeds as before. The coucher, who receives the first mould, having a heap of porous pieces of flannel by his side, called felts, turns the mould over upon a felt, upon which the sheet remains; and placing a felt on the sheet, he is ready to turn over another from the second mould. Thus the vatman and the coucher proceed, the one moulding a sheet of paper, and the other placing it upon felt, till they have made six or eight quires. The heap is then subjected to the action of a powerful press. The sheets, after this pressure, have acquired sufficient consistency to enable them to be pressed again by themselves. The felts are accordingly removed, and one sheet being laid upon another, the heap is subjected to a moderate pressure. The sheets are next parted; then dried, five or six together; next sized, by dipping; again dried and pressed; examined to throw out any damaged sheets, or to remove knots; and, finally, put into quires and reams.

We now resume our description of the manufacture of paper, as we saw it at the Albury mill. It may be convenient, before describing the operation of the paper-machine, to refer to a wood-cut of it, which was drawn from the one employed in making the sheet of paper which the reader now looks upon. (See page 381.)

We will endeavour to conduct the reader, step by step, through the rapid but most complicated operation of converting the pulp of rags into paper by machinery. But no description, however accurate and clear, can stand in the place of a personal examination of this most beautiful process. In the whole range of machinery, there is, perhaps, no series of contrivances which so forcibly address themselves to the senses. There is nothing mysterious in the operation; we at once see the beginning and the end of it. At one extremity of the long range of wheels and cylinders we are shown a stream of pulp, not thicker than milk and water, flowing over a moving plane; at the other extremity the same stream has not only become perfectly solid, but is wound upon a reel in the form of hard and smooth paper. This is, at first sight, as miraculous as any of the fancies of an Arabian tale. Aladdin's wonderful lamp, by which a palace was built in a night, did not in truth produce more extraordinary effects than science has done with the paper-machine. We were compelled patiently to watch the process for a long time before we could divest our minds of a vacant feeling of wonder, and prepare to understand the manifold arrangements by which these extraordinary effects are produced. We will attempt rapidly to convey our first impressions to the reader; reserving, for the present, any detailed explanations.

At one extremity of the machine is the chest, full of stuff or pulp, marked A in the wood-cut. We mount the steps by its side, and see a long beam rolling incessantly round this capacious vessel, and thus keeping the fibres of linen, which look like snow-flakes, perpetually moving, and consequently equally suspended, in the water. At the bottom of the chest, and above the vat, B, there is a cock, through which we observe a continuous stream of pulp flowing into the vat; which is always, therefore, filled to a certain height. From the upper to the lower part of this vat,—or, following the wood-cut, from the left to the right division,—a portion of the pulp flows upon a narrow wire frame, which constantly jumps up and down with a noise resembling a cherry-clack;—this is called a sifter, and is marked C. Having passed through the sifter, the pulp flows still onward to a ledge, over which it falls in a regular stream, like a sheet of water over a smooth dam. Here we see it caught upon a plane, which presents an uninterrupted surface of five or six feet, upon which the pulp seems evenly spread, as a napkin upon a table; this space is indicated by E. A more accurate inspection shows us that this plane is constantly moving onwards with a gradual pace; that it has also a shaking motion from side to side; and that it is perforated all over with little holes—in fact, that it is an endless web of the finest wire. If we touch the pulp at the end of the plane, upon which it first descends, we find it fluid; if we draw the finger over its edge at the other end, we perceive that it is still soft—not so hard, perhaps, as wet blotting-paper,—but

so completely formed, that the touch will leave a hole, which we may trace forward till the paper is perfectly made. The pulp does not flow over the sides of the plane, we observe, because a strap, on each side, constantly moving, and passing upon its edges, regulates the width; these straps are marked F. After we pass the wheels upon which these straps terminate, we perceive that the paper is sufficiently formed not to require any further boundary to define its size;—the pulp has ceased to be fluid. But it is yet tender and wet; and we see that a wire cylinder, G, which presses upon its surface, leaves a succession of lines marked upon it in its passage. The paper, we perceive, is not yet completely off the plane of wire: before it quits it, another roller, I, which is clothed with felt, and upon which a stream of cold water is constantly flowing, subjects it to pressure. The paper has at length left what may be called the region of *Wire*, and has entered that of *Cloth*. A tight surface of flannel, or felt, is moving onwards with the same regular march as the web of wire. Like the wire, the felt is what is called endless,—that is, united at the extremities, as a jack-towel is. We see the sheet travelling up an inclined plane of this stretched flannel, which gradually absorbs its moisture. It is now seized between two rollers, L, which powerfully squeeze it. It goes travelling up another inclined plane of flannel, and then passes through a second pair of pressing-rollers, M. It has now left the region of cloth, and has entered that of *Heat*. The paper, up to this point, is quite formed; but it is fragile and damp. It is in the state in which, if the machinery were to stop here, as it did upon its first invention, it would require (having been wound upon a reel) to be parted and dried as hand-made paper is. But in a few seconds more it is subjected to a process by which all this labour and time is saved. From the last pair of cloth-pressing rollers, the paper is received upon a small roller marked N. It is guided by this over the polished surface of a large heated cylinder, O. The soft pulp tissue now begins to smoke; but the heat is proportioned to its increasing power of resistance. From the first cylinder, or drum, it is received upon a second, P, considerably larger, and much hotter. As it rolls over this polished surface, we see all the roughness of its appearance, when in the cloth region, gradually vanishing. At length, having passed over a third cylinder, Q, still hotter than the second, and having been subjected to the pressure of a blanket, which confines it on one side, while the cylinder smooths it on the other, it is caught upon the last roller, R, which hands it over to the reel, S,—the perfect substance which the reader now holds in his hand. But there is no division in the paper thus formed; it is an uninterrupted roll of yard upon yard, which has no necessary termination but the power of reeling it. A supplementary machine (see the wood-cut in the last page) receives it off the reel; and as it mounts upon the drum, T, a circular knife cuts it into two breadths; while, having descended to the point V, a series of sharp teeth, which strike against it within, divide it, by a stroke of invariable regularity, into the requisite lengths. The sheet of paper for a "Penny Magazine" is now made. The process is as rapid as it is beautiful. It has taken us two hours to write this very imperfect description of it. From the commencement of the process, when the pulp flows out of the vat upon the web of wire, till the paper into which it is formed is received upon the reel, somewhat less time than two minutes is occupied. We ascertained the fact by drawing our finger across the wet mass before it left the web, and tracing the rent into the final stage of the formation of the paper. The web of wire travels at a rate which produces twenty-five superficial feet of paper per minute.

In all machinery which takes the place of handiwork there must be certain points of resemblance, or of contrast, between the one process and the other, which are instructive to examine. Up to the formation of the pulp or stuff, the process of paper-making is the same, as we have seen, whether the pulp is to be converted into paper by hand or by machinery. The vatman dips his mould into the vat, and produces a soft sheet of paper, of uniform thickness, by that delicacy of touch whose perfection constitutes the best workman. But as this regularity essentially depends upon manual dexterity, it must necessarily be incomplete. It may vary with the health of the workman; with the temperature in which he is placed; with the time of day at which he labours. In the machine the thickness of the paper is regulated by the quantity of stuff which is allowed to flow out of the chest; and all that is required to render this thickness invariable, is an invariable speed in the motion of the machine. If the web of wire travel at a rate that will make twenty-five feet of paper a minute, and the chest discharges (we will say) five gallons of stuff in the same period, there can be no change in the thickness of the sheet. But let the machine move with greater speed,—let the web travel at the rate of making thirty feet in a minute, while the chest still discharges only five gallons of stuff,—and the paper will be thinner by one-fifth. Again, let the pace of the machine be unaltered, but let the chest discharge ten gallons instead of five in the minute, and it is manifest that the thickness of the sheet will be doubled. So far the machine has an advantage over the workman. It goes on to copy his movements. As the water drains through the web of wire in its inward passage, leaving the pulp upon the surface, the machine imitates the action of the vatman, who holds his mould for a space over the vat; and as he gently shakes the mould to distribute the pulp evenly over its surface, so has the web a shaking motion, from side to side, to produce the like effect. The vatman loses none of his material; for every particle of unused fibre returns through the mould into the vat, with the sized water, with which the stuff is often prepared: the machine is equally economical;—for all that drains through the wire web is collected in a cistern near the point H, where the web returns, and is lifted up and discharged again into the vat by the lifter D. As the vatman also defines the size of his sheet by the deckel fitting to the mould, so the deckel straps of the machine, constantly moving onward, and pressing tightly upon the edges of the moving pulp, regulate its width. In hand-made paper that sort which is technically called laid,—that is, marked with lines,—receives this appearance from wires crossing the web. The same appearance, if it be thought desirable, is imparted in the machine by the wire cylinder G, called a dandy. The coucher, whose functions we have already described, removes the sheet made in a mould from the vatman, and places it between two felts. The same absorption is caused in the machine, by the sheet travelling over a large felted surface, and passing between felted rollers, at I, at L, and at M. These rollers, be it observed, do the work also of the pressure to which the hand-made paper is subjected before it is dried. So far the operations of making paper by hand and by machine have a certain general resemblance. But here the parallel ceases. The beautiful contrivance of drying and smoothing the sheets by hot cylinders, O, P, and Q, are a modern application to the machine; and they certainly give the process a perfection which is unattainable in the system of drying each sheet, either by exposure to the atmospheric air, or to steam, upon poles. Mr. Fourdrinier, who perfected the machine as far as making the paper upon an endless web of wire, and pressing it in various felts, did not attempt the great modern improvement of drying the sheets without removal. Each cylinder is heated by steam, from a pipe communicating with its hollow part within. The heat, as we have mentioned, is gradually imparted to the paper. If the first cylinder which receives the sheet be taken at

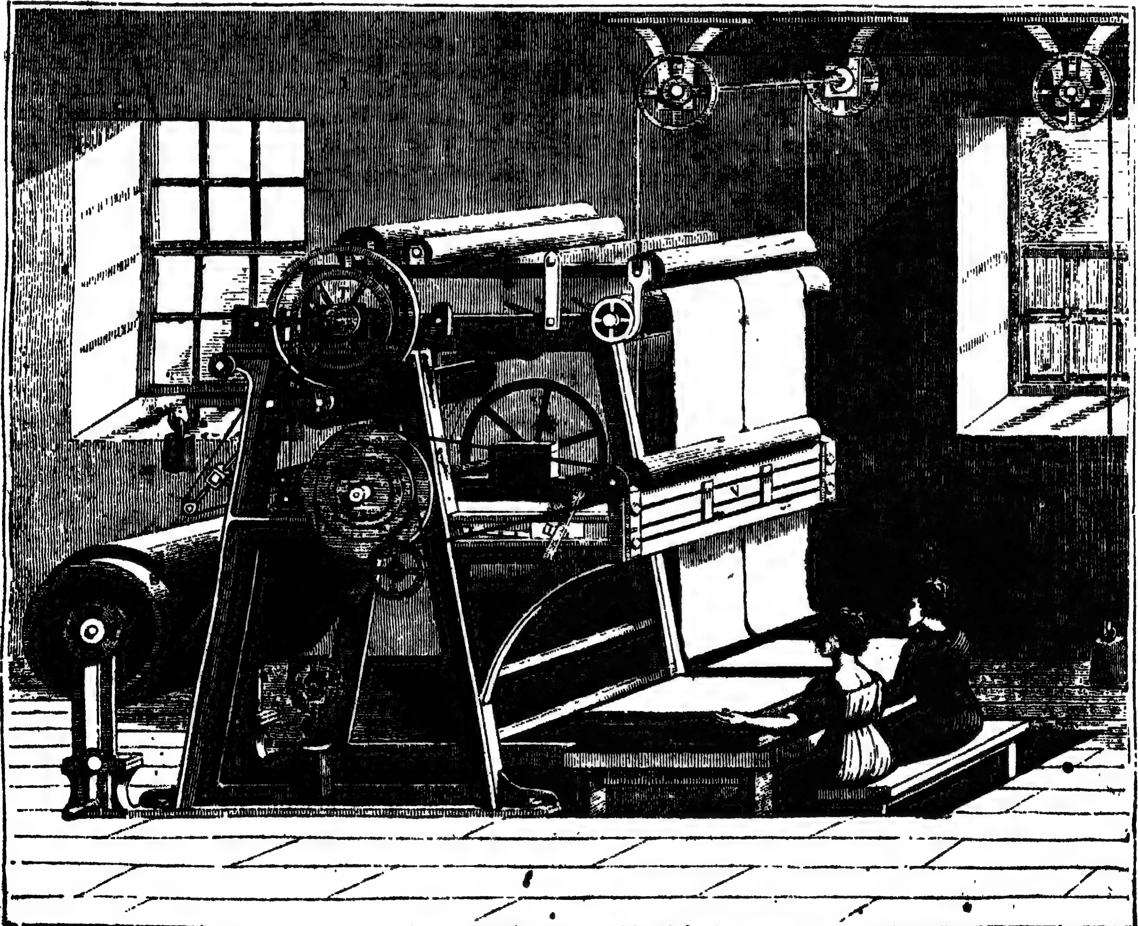
the temperature of 80°, the second would be 100°, and the third 120°.

The cutting machine, which may or may not be applied to the paper-making machine, is an extremely beautiful contrivance, invented by Mr. Edward Cowper. Its object is chiefly to save material. It was usual, after a certain quantity of paper had been reeled, to cut it through while upon the reel. But it is evident that the sheets would consequently be irregular in their size, so that the inner part of the roll, when cut, might be an inch or two smaller than the outer part, according to the quantity reeled.

Mr. Dickinson, one of the most ingenious and successful manufacturers of paper in the kingdom, has constructed machines differing essentially from those of Fourdrinier's invention, as regards the formation of the pulp into paper upon the web of wire. This machine is thus briefly described in Dibdin's "Bibliographical Decameron."—"Mr. Dickinson employs a hollow cylinder, the surface of which is pervious, and is covered with woven wire; and this revolves in a vat of pulp, though not completely immersed; but by the axis, which is a hollow tube, there is a communication from some internal apparatus to a pair of air-pumps, and by their action the paper is formed, and made to adhere to the cylinder, and afterwards detached from it to an endless cloth, which conducts it to the pressing-rollers. The pulp for this machine is much more dilated than for any other mode of making paper, and therefore admits of the fibres which compose it being longer, which has a beneficial effect with regard to the texture of the paper, and renders it better adapted to receive a clear and distinct impression."

When the sheets of paper, completely formed and cut by the process we have described, are taken from the machine-room, they are subjected to a very careful examination. This work is performed by young women, who are as neat in their persons as the upper workwomen in a well-regulated cotton-mill. It is their business to remove every knot or speck in each sheet, and to lay aside those which have any rent or hole. The sheets, thus finished, are next subjected, in their full size, to the action of a powerful press. They are then cut round the edges, by what is called a plough; for it is essential to the beauty and regularity of printing, that the edges of the paper should be perfectly smooth. The open sheets are then counted into quires of 24 sheets; then folded in quires; then put into reams of 20 quires; then pressed in reams; and, lastly, tied up in wrappers. The exciseman now steps in, and charges each ream with a duty of 3*d*. per lb. before it can be removed for sale.

We have already mentioned that the web of wire in the paper-machine travels at a rate to produce twenty-five superficial feet of paper per minute. In a working-day of ten hours, 15,000 feet will consequently be produced. This quantity is equivalent to about twenty-four reams, or 11,520 sheets, of paper twice the size of a "Penny Magazine." Our yearly consumption is about 14,000 reams; so that, taking the number of working days throughout the year at 312, it will require the constant working of two machines all the year round to produce the paper for our yearly demand. A paper-mill with only one machine, and no vats, is held to carry on a respectable business, employing about forty hands. Two mills of this description would be wholly engaged in producing the paper for the "Penny Magazine."



[Paper-Cutting Machine.]

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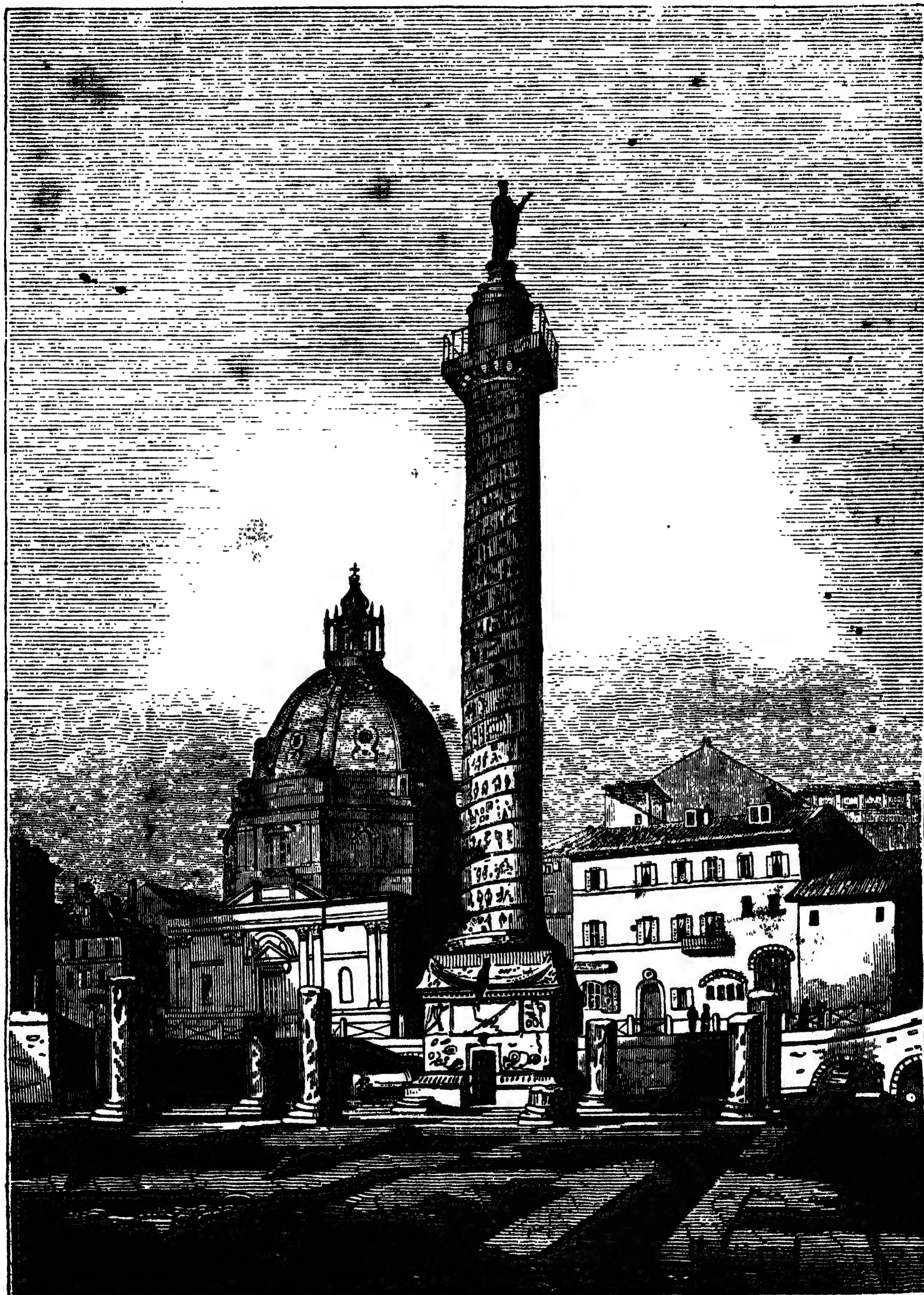
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TRAJAN'S COLUMN.



[Trajan's Column, at Rome.]

Among the monuments of antiquity still remaining in Rome, one of the most famous and most interesting is the beautiful column of which the above is a representation. According to the inscription which is still to be read on its base, it was erected by the senate and people of Rome in honour of the victories obtained by the emperor Trajan in his two expeditions against the Dacians, in the first of which he compelled that fierce people to sue for peace, and in the second entirely conquered their country, and added it to the dominions of Rome. The former was undertaken in the year 101, and lasted for three years;—on the latter he set out in 105, and returned the year following, the war having been thus speedily terminated by the Dacian king, Decebalus, putting himself to death to avoid the risk of what he deemed a worse fate. The column was erected in the year 115, after Trajan had gone on his last expedition, that against the Parthians and Armenians. From this he never returned, having been cut off by a dysenteric fever at Seleucia in 117. He never, therefore, beheld the magnificent structure which had been raised to record his glory.

The pillar of Trajan originally stood in the midst of a large square or forum, as it was called, the buildings surrounding which comprehended a palace, a gymnasium, a library, several triumphal arches, porticos, and other erections in the most superb style of architecture. Gilded statues and military ensigns glittered on the fronts of the buildings; and, besides the column, an equestrian statue of the emperor appears to have occupied a conspicuous position in the open space within. For richness of display there was probably nothing in Rome comparable to this forum. Cassiodorus, a writer who flourished in the beginning of the sixth century, while the buildings, as may be gathered from his account, were still standing, says of it, "The forum of Trajan is a perfect miracle, if we inspect it even with the utmost minuteness."

All the buildings of the forum of Trajan are now thrown down, with the exception of the pillar. Their ruins have raised the present streets fifteen feet above the ancient pavement. A few years ago, however, the accumulated soil and rubbish were removed immediately around the column, which is now, therefore, to be seen standing in the excavation in its full dimensions. It is built of white marble, which was probably also the material of the surrounding buildings, as it certainly was of their pavements, which have been in part uncovered. It consists of a base, a shaft of the Doric order, and a capital; and it was anciently surmounted by a statue of the emperor, in place of which one of the apostle Peter has been substituted. The ashes of Trajan are said to have been contained in a golden ball, which rested on the head of the figure, and which is believed to be the same that is still to be seen ornamenting the great staircase of the Capitol. Including the statue, the height of the whole is stated by ancient writers to have been one hundred and forty feet. The height of the pillar alone is one hundred and twenty-eight modern Roman or one hundred and twenty-four English feet.

The whole consists of only thirty-three blocks of marble, of which eight compose the base, twenty-three the shaft, one the capital, and another the pedestal supporting the statue. It is ascended by a spiral staircase in the interior, which is entirely cut out of the same stones. There are forty-three loop-holes or apertures for the admission of the light.

But the most curious part of the column is the sculpture in bas-relief by which the whole of the shaft is covered. The series of delineations runs round the pillar in an ascending spiral riband, which makes in all twenty-two revolutions before reaching the top. On this is represented, in chiselling of exquisite delicacy, the succession of Trajan's Dacian victories, together with the two triumphal processions by which they were celebrated. The figures, which are designed with great spirit, are not fewer than between two and three thousand in number, that of Trajan occurring about fifty times. In the lower part of the shaft they are each about two feet in height; but as they ascend and are removed farther from the eye their dimensions are enlarged, till at the top they become nearly double the size of those below.

These sculptures are extremely interesting in another point of view, as well as for their merit as works of art. "The Roman dress and manners," says Mr. Burton, in his 'Description of the Antiquities of Rome,' "may receive considerable light from these bas-reliefs. We find the soldiers constantly carrying their swords on the right side. On a march they are generally bareheaded;—some have no helmet at all; others wear them suspended to their right shoulder. Some of them have lion's heads by way of a cap, with the mane hanging down behind. Each of them carries a stick over the left shoulder, which seems to have been for the purpose of conveying their provisions. We may observe a wallet, a vessel for wine, a machine for dressing meat, &c. We know from other accounts that they sometimes carried sixty pounds, and food for seventeen days: they never carried less than enough for three days. Their shields are oblong, with different devices upon them. The standards are of various kinds; such as a hand within a wreath of laurel, which was considered a sign of concord. Pictures also were used, which were portraits of gods or heroes. The soldiers wear upon their legs a kind of tight pantaloon, reaching a little below the knee, and not buttoned. The Dacians have loose pantaloons reaching to the ankle and shoes; they also carry curved swords. The Sarmatian cavalry, allies of Decebalus, wear plate armour, covering the men and horses. These were called Cataphracti or Clibanarii; and the words of Ammianus exactly answer the representation on the column—'Their armour was a covering of thin circular plates, which were adapted to the movements of the body, and drawn over all their limbs; so that in whatever direction they wished to move, their clothing allowed them free play by the close fitting of its joints.' * * * Some Roman soldiers have also plate-armour; but they are archers. The horses have saddles, or rather cloths, which are fastened by cords round the breast and under the tail. The Dacian horses are without this covering; and the Germans, or some other allies, have neither saddles nor bridles to their horses. We might observe several other particulars, such as a bridge of boats over a river, and that the boats everywhere are without a rudder, but are guided by an oar fastened with a thong on one side of the stern. The wall of the camp has battlements, and the heads of the Dacians are stuck upon it. The Dacian women are represented burning the Roman prisoners."

Our wood-cut is principally copied from a plate in the splendid work on the 'Architectural Antiquities of Rome,' by Messrs. E. Cresy and G. L. Taylor. It represents the column with the surrounding ground and buildings, as the whole appeared soon after the late excavations. In the foreground is seen a portion of the pavement of the basilica, or palace, which formed one of the most sumptuous buildings of the Forum; and the pillars which are ranged around are some of those that had belonged to the same edifice. "The church to the left," says the description appended to this print, "is dedicated to the Madonna di Loretto; it was erected by Bramante, and its cupola is one of the earliest specimens of that modern appendage to a church, and is supposed to have been the prototype of the admirable dome of St. Peter's.

There is a work, we may add, published in Rome, in a folio volume, in 1616, by a Spanish friar of the name of Alfouso Ciaconus, or Ciacono, in which is given a

series of delineations of the sculptures on Trajan's column, in above three hundred plates, on a large scale. It is entitled 'Historia Utriusque Belli Dacici à Trajano Cæsare gesti;' and the author has endeavoured to make out a connected account of the incidents of the emperor's two Dacian expeditions from the historical record of them on the column. It might be interesting to compare these classic picture annals with the attempts of the Mexicans in the same style.

MINERAL KINGDOM.—Section 13.

Organic Remains.—(*Continued.*)

The examples we have as yet given of the more remarkable fossil animals have been such only as are found in the secondary strata,—that is, in the chalk and the beds inferior to it. We shall now mention some of the most striking circumstances connected with those met with in the formations superior to the chalk, or in what are usually termed the tertiary strata. In these a remarkable change in the nature of the animal remains takes place. There commences, immediately after the chalk, a nearer approach to the present state of the animal creation, for we then first begin to find fossils identical with species now living, whereas nothing of the sort is to be seen either in the chalk or in the strata beneath it.

The tertiary strata consist of a very extensive series of deposits, showing, by their positions and the nature of the organic remains they contain, that some of them must have been formed at much earlier periods than others of the same class, and that there is an order of succession in these, as in the secondary strata, which is never reversed. There is, moreover, abundant evidence to prove that, in many instances, great local changes had taken place in the forms of the external crust of the globe, between the deposit of one series of the tertiary strata and that of the formation which lies above it. There is, however, among these beds a much greater resemblance to each other, in so far as mineral composition is concerned, than in the case of the secondary strata;—they consist of sand, sandstones, clays, and limestones, so very like one another, and, in fact, so identical in mineral structure, that it would be impossible to distinguish between two strata, that were deposited at periods many thousand years distant, perhaps, from each other, by the mere mineral characters, but which we are enabled to do, with the utmost precision, by the different species of fossil shells which they severally contain, generally in great abundance, and having their forms, for the most part, well preserved.

Observations have already been made in different countries with so great a degree of accuracy, and upon so extensive a scale, as to enable geologists to ascertain that there have been four great epochs, or periods, succeeding each other in chronological order, during which the tertiary strata were deposited. The grand distinction between secondary and tertiary formations is founded upon the existence in the latter of animal remains identical with living species; and the extension of that same principle forms the ground of separation between the successive periods of the tertiary series. Mr. Lyell, in his recent work, ('Principles of Geology,' vol. iii.,) has been the first to give a full systematic view of all we know concerning that grand division of the strata which envelope the earth of what we may call the tertiary system; and he has proposed expressive and convenient designations for the four great periods above alluded to, calling them the Eocene, Miocene, Older Pliocene, and Newer Pliocene Periods. The termination *cene* is taken from a Greek word signifying recent, and the rest of the term indicates the *proportion* of recent or living species contained in the deposit. Thus the first, or earliest period, which comprehends the deposits immediately after the chalk, he calls Eocene, from *eos*, Greek for the early dawn, because recent species just then begin to appear; the second period he calls Miocene, from *meion*, signifying a minor quantity; the third period, the older Pliocene, from *pleion*, a major quantity; the fourth period, Newer Pliocene, from the increased proportion of recent species. When future discoveries require us to establish more minute subdivisions,—as, for instance, our finding deposits older than the Miocene, but more modern than the Eocene,—they may be called Newer Eocene, or Older Miocene, according as they partake more or less of the nature of the great divisions below and above them.

It has been found that in certain beds above the chalk the number of fossil shells, which can be identified with living species, does not exceed one-thirtieth part of all the shells they contain, and these beds are referred to the Eocene period; another suite of deposits, lying above the Eocene, have been found to contain about one-fifth part of recent species, and these are considered as belonging to the Miocene period; above them come a more modern set, having from a third to more than a half of recent species, and these constitute the beds of the Older Pliocene period; the deposits above these last contain so great a proportion as nine-tenths of recent species, and they are referred to the Newer Pliocene period. Expressed in numbers, the relative proportions stand thus:

Eocene period	containing	3½	per cent. of fossil shells identical with existing species.
Miocene period	"	20	
Older Pliocene period	"	50	
Newer Pliocene period	"	90	

It is not, however, to be understood that such periods are defined by strict limits in nature; the terms are no more than expressions of the present state of our knowledge—arbitrary signs, for the convenience of classification, indicating the predominance of certain characters in the deposit. It is but a few years since the great tertiary division was established; and there is every reason to expect, from past experience, that the examination of unexplored tracks of those deposits will bring to light new groups, which, by their position and fossils, may be proved to be intermediate in point of age between two of the great divisions or periods above mentioned. Discoveries such as these Mr. Lyell anticipates, in which case we might have lower, medial, and superior *Eocene* deposits, and likewise lower, medial, and superior *Miocene* deposits. The observations already made have pretty well established that all living species are not of the same degree of antiquity; that some have preceded others upon the surface of the earth by an interval of time to which we have no means of assigning any limit. The question whether the newly arriving species made their appearance singly or in great groups all at once, is far from settled in the minds of geologists; and it can never be satisfactorily decided except by very extended observations, by minute and accurate researches, upon a very comprehensive scale.

Another grand distinction between the tertiary and secondary classes is the frequent occurrence in the former of strata which must have been deposited in vast lakes of fresh water, while we have no instances of the kind in the latter. We have, it is true, secondary deposits containing fossil remains of animals which must have lived in fresh water, but in those cases there is usually a mixture of marine shells, showing that these deposits must have taken place in estuaries, where great rivers had entered the sea. In the tertiary periods we meet with vast quantities of fossil shells belonging to species which inhabit lakes and rivers, many species of lake and river fishes and reptiles, of land animals, and of plants. These sometimes occur by themselves in accumulations of successive layers; at other times they are interstratified with beds containing marine shells only, and very often the productions of fresh water and sea water are mingled together in the same bed—phenomena which very clearly

indicate extraordinary and very extensive local changes in the earth's surface. Some fossil shells identical with living species are common to all the four periods, others that are common to all the periods are now extinct. We have many instances of fossil shells belonging to living species mingled with the bones of extinct quadrupeds. Of all organized bodies, shells and corals have had the longest range of existence, for there are living genera of both which may be traced back from the tertiary beds to those strata in which the first dawn of animal life is discoverable.

[The subject of Organic Remains will be concluded in Section 14.]

CATHEDRAL OF ROCHESTER.



[Principal Entrance and Interior of Rochester Cathedral.]

There is no other of our cathedrals, perhaps, that presents so antique and time-worn an aspect as that of Rochester. It is in reality one of the oldest ecclesiastical edifices in England, having been principally erected before the close of the eleventh century. Its architecture, therefore, is of the earliest Norman style, or that which preceded what is commonly called the Gothic.

As we stated in our account of the city of Rochester,

in a former Number, the cathedral stands near the middle of the town, and at a short distance south from the High Street. Owing to the chapels and other extraneous structures which have been attached to it, the building has an irregularly shaped exterior; but what forms the church consists of a nave, with aisles, and a choir, extending, as usual, from west to east, crossed by two transepts, the greater nearest the west end, and the other between the bishop's throne and the high altar in the choir. The entire length of the cathedral, from east to west, is 306 feet, of which 156 feet constitute the portion from the entrance of the choir to the east end. The breadth of the nave, including the aisles, is 61 feet; and the greater transept is 122 feet, and the other 90 feet in length from north to south. Over the intersection of the greater transept and the nave is a tower, surmounted by a spire of 156 feet in height. The extent of the west front is 81 feet; and rising along this line are four smaller towers, one from each of the extremities, and the other two from the sides of the great door.

This principal entrance to the church has formerly presented an extraordinary display of rich and florid architecture, although its decorations are now sadly defaced. On each side of the door, the whole depth of the wall, stands a row of small pillars, supporting a corresponding series of arches. Two of the pillars are fashioned into statues, which are understood to have been intended to represent Henry I. and his queen, Matilda, in whose time the structure was raised. The capitals of the others are formed of figures of various flowers and animals. Every stone of the front arch is also marked by a separate device. Under the arch there appears to have been carved a representation of Christ, sitting in a niche, with an angel on each side, and the twelve apostles at his feet; but the design is now greatly obliterated. There is a large window over the door, which, however, is evidently the work of a later age.

The windows throughout the cathedral, indeed, as well as the roof, appear all to have been raised higher long after the first erection of the building. The more ancient part of the interior is in a plain style of architecture; and the circular arch, and massy pillar with its unornamented capital, every where indicate the remote age to which the fabric belongs. Small columns of Petworth marble ornament the choir, the fittings up of which were renewed about the middle of the last century.

The first Christian church at Rochester was begun by Ethelbert, King of Kent, in the year 600, and finished in 604; when the bishopric was established, and Justus, one of the companions of Augustine, was appointed by that prelate to preside over the diocese. With the exception of a short period during which he retired to France, on the relapse of Edbald, the son and successor of Ethelbert, to idolatry, Justus continued to occupy the see till he was removed, in 624, to Canterbury. Rochester, like almost every other Saxon town, was repeatedly laid nearly in ruins in those early times, sometimes by hostile attacks, sometimes by accidental fires; but if the cathedral was ever entirely destroyed on any of these occasions, there is at least no account of its having been rebuilt. The first new structure of which we read, is that which still remains, and which was begun by Bishop Gundulph, about the year 1080. Gundulph was bishop of Rochester for above thirty years, and appears to have applied his great talents with extraordinary zeal and energy to the promotion of the interests of his see. At the same time with the cathedral, King Ethelbert had founded here a religious house or monastery, which he filled with secular canons. This establishment, Gundulph, among his other innovations, transformed into a house of regular Benedictine monks, the society to which he had himself belonged before his elevation to episcopal rank. Besides his new cathedral, he built a lofty tower, the ruins of which still remain, as an addition to the castle erected in the city by the Conqueror, and a smaller structure of the same kind close to the north wall of the church, which is also still standing, and which is supposed to have been intended as a receptacle for the charters and other records of the see. The funds for his different architectural undertakings he seems to have derived in great part from the liberality of the King, Henry I., with whom and his Queen Matilda, he was a great favourite. An old writer, William Lambarde, in his 'Perambulation of the County of Kent,' says of Gundulph, that "he never rested from building and begging, tricking and garnishing, until he had erected his idol building, to the wealth, beauty, and estimation of a Popish priory." The eastern part of the church, however, forming the choir, was not built till the middle of the thirteenth century; and other parts of the fabric are of still more recent date. The whole suffered considerable injury at the Reformation; but much greater at the commencement of the civil wars in the seventeenth century, when a party of the Parliamentary soldiers, under Colonel Sandys, are said to have converted one part of the church into a carpenter's shop, and another into a tippling house.

A VISIT TO HOFWYL.

We have received the following interesting communication from a correspondent upon whose accounts we can place a full reliance. The establishments for education, which have been founded and matured in Switzerland, by the public spirit and laborious perseverance of M. Fellenberg, have now existed about thirty-two years. Their high merits have been long familiar to the English public. At the present time, we understand that certain political dissensions, which have produced much ill-will and unhappiness in the canton of Berne, have had the common effect of all violent contests of opinion,—they have made men indifferent or opposed to those institutions for the amelioration of the human character, whose great object is to elevate our species above the intolerance and narrowness of party-feeling. We trust that the open or concealed hostility which, it is said, now threatens the excellent establishments of M. Fellenberg will speedily be put to shame by the good sense of the people of Switzerland; who will perceive in such institutions the surest preservation against the outbreaks of a mistaken zeal for freedom, on the one hand, and the tyranny of exclusive pretensions, on the other.

In the month of August, 1832, I travelled into Switzerland for the purpose of making myself acquainted with the schools and institutions at Hofwyl. Situated about three leagues from the picturesque capital of Berne, amidst a beautiful scenery, composed of a cultivated vale, the Jura ridge of mountains, a pine forest, a small lake, and the glaciers of the Bernese Alps, stand the extensive buildings of the establishment, surrounded by about two hundred and fifty acres of farm land. Upon my first arrival, before I could obtain an opportunity of presenting my letters to the benevolent founder, I wandered about in various directions,—all was business and activity. Here was a troop of lads cutting the ripened corn, while another troop was engaged in conducting it to the barns. Here was the forge in activity, and there some little gardeners performing various operations in small plots of ground that were portioned out: here were a group of little girls gleaning, there others carrying water, most of them singing while thus employed. But my attention was peculiarly arrested by about one hundred men, who in a large open building, erected in a recess of the garden, appeared to be engaged like boys in a schoolroom; over the entrance was inscribed this motto, "The Hope of their Country."

I was at last fortunate enough to be admitted into the

study of M. de Fellenberg,—a man somewhat advanced in years, with a countenance beaming with intelligence and kindness. De Fellenberg was, by birth, one of the ancient aristocracy of the country, and in possession of the hereditary property of his family. He determined upon devoting his fortune, and the labour of a life, in the endeavour to effect the regeneration of his native land, by the means of education. "I will infuse good habits and principles into the children," said he, "for in twenty short years these children will be the men, giving the tone and the manners to the nation." For thirty-two years has he pursued his steady course, increasing in influence, and extending his establishment as his scheme grew upon him, until it has become what he described to me. "This," said he, pointing to a large building, "is the institute for the boys of the higher classes. Here are their dining-rooms;—arranged on each side of yonder galleries are their dormitories. Here you see their gardens, their museum, their work-shops, their school-rooms; here their gymnasium where they exercise themselves in wet weather, here their stream of running water where they bathe every day: study is their employment, bodily labour their recreation,—but bodily exertion I insist upon. There is no health, no vigour of mind, no virtue without it. Those persons grown to manhood, who are mixing with the boys, are placed by me to observe every action, and catch every expression. My grand object is to comprehend thoroughly the character of my pupils, in order that I may work more efficaciously upon them. These persons are by no means considered as spies by the boys; they are their companions. At Hofwyl all that is not in itself wrong is permitted. I never like to forbid a thing when I am unable to assign a reason for doing so: it creates a confusion in young minds with regard to principle, a thing most dangerous to their future happiness. We have no boundary-mark, yet my boys stay at home; we interfere not with their pleasures, yet they cling to their duty.

"Within this enclosure is my eldest daughter's poor school for girls. She has about a hundred under her direction, who are fed and clothed by the establishment. To these she devotes her entire time. They learn all that in after-life will be of service to them:—to clean the house,—to cultivate the garden,—to sew,—to make all those little necessaries which are of so much importance in the cottage; to read, to sing,—to be cheerful, and to be happy. Unless our women be brought up in modesty, and with industrious and religious habits, it is in vain that we educate the men. It is they who keep the character of men in its proper elevation.

"Here is my school for the middling classes,—here all instruction has reference to practical purposes. Man was born to have dominion over the earth, and to subdue it, but it is by the intellect alone that he can do so. His unassisted strength, what is it? To conquer Nature he must understand her. Look in here, and you will see the laboratory of the chemist, and the lever and the pulley of the mechanic.

"In these two buildings are my poor school for boys, who are boarded and clothed by the establishment. And well they earn their maintenance, for the little fellows work ten hours a-day in the summer; and the expense that I incur in their behalf is nearly repaid by their exertions. They study for two hours each day, and this I consider sufficient. The case here is the reverse of the Institute, for bodily exertion is the labour and study the recreation. The habits I bring them up with are those which I desire should continue with them through life; they consequently have reference to their probable position in society. The habit of continued study would ill-become a person destined to gain his livelihood by his hands. Although there are now one hundred boys assembled here, mine were but small beginnings. I had but one pupil at first. It was long before I could find a master in whom I could confide. Do you observe those little patches of garden-ground? Each poor lad has one to himself; and the produce belongs exclusively to him. They usually dispose of it to the establishment, which either pays them the money at the time or lodges it for them in a little bank I have founded. Many of them have very considerable sums there. It is here that they obtain a habit of passing the greater portion of their time in continued and patient labour;—they become acquainted with the value of labour by the produce of their little gardens. The instruction that I give them, although somewhat more elevated than what is generally obtained by persons of their rank in life, is directed to the rendering perfect the senses and reflection,—to make them better practical men; drawing, the sciences of arithmetic and geometry, a useful selection from the other sciences, all taught in the most unostentatious manner: the history of their native country, and an acquaintance with the different natural objects around them, together with music, form the extent of their literary instruction.

"Religion is inculcated in every way. Public prayer, both at church and at school, is regularly performed in common with the schools of other countries. Besides this, these poor lads are taught to see the Creator in his works. When their admiration is roused by a natural object, they are accustomed to direct their thoughts to its Maker.

"But here," said my venerable companion, "is the engine upon which I rely for effecting the moral regeneration of my country (and my attention was directed to the men whom I had before seen in the morning); these are the masters of village schools, come here to imbibe my principles and to perfect themselves in their duty. These men have *six thousand* pupils under them; and if, by the blessing of God, I can continue the direction of them, success is certain."

To insure success M. de Fellenberg spares no pains,—no expense. There are no less than thirty-two professors solely devoted to his establishment, who inhabit a house to themselves upon the premises.

In all, there are about three hundred and fifty individuals in this little colony. Despite of his enemies, the spirit of De Fellenberg is spreading throughout Switzerland; and after having seen the parent institution, I visited several of his establishments in some of the remotest cantons.

A week closed my short sojourn at Hofwyl. I quitted it with a heavy heart; and the recollection of the moral beauty of what I there witnessed will remain riveted on my memory for ever.

THE WILD TURKEY.

(Abridged from C. Bonaparte's 'American Birds.')

The native country of the wild turkey extends from the north-western territory of the United States to the isthmus of Panama; south of which it is not to be found. In Canada, and the now densely-peopled parts of the United States, this bird was formerly very abundant; but the progress and aggressions of man have compelled them to seek refuge in the remote interior. It is not probable that the range of the wild turkey extends to or beyond the Rocky Mountains. The Mandan Indians, who a few years ago visited the city of Washington, considered it one of the greatest curiosities they had seen, and prepared a skin of one to carry home for exhibition.

It is not necessary to be particular in describing the appearance of a bird so well known in its tame state. The difference consists chiefly in the superior size and beauty of plumage in the wild turkey; for, under the

care of man, this bird has greatly degenerated, not only in Europe and Asia, but in its native country. When full grown, the male wild turkey is nearly four feet in length and nearly five in extent, (from wing to wing,) and presents in its plumage a rich assortment of colours, brown predominating, which might be vainly sought in the domesticated bird. Altogether his appearance is such as, with other considerations, disposed Dr. Franklin to regret that he, rather than the bald eagle, had not been selected as the national emblem of the United States. But since the choleric temper and the vanity of the tame turkey have become proverbial in various languages, the authors of 'American Ornithology' are well pleased that its effigy was not placed on the North American escutcheon.

The wild turkeys do not confine themselves to any particular food; they eat maize, all sorts of berries, fruits, grasses, beetles; and even tadpoles, young frogs, and lizards are occasionally found in their crops; but where the pecun nut is plenty, they prefer that fruit to any other nourishment. Their more general predilection, however, is for the acorn, on which they rapidly fatten. When an unusually profuse crop of acorns is produced in a particular section of country, great numbers of turkeys are enticed from their ordinary haunts in the surrounding districts. About the beginning of October, while the mast still remains on the trees, they assemble in flocks and direct their course to the rich bottom lands. At this season they are observed in great numbers on the Ohio and Mississippi. The time of this irruption is known to the Indians by the name of the *Turkey month*.

The males, usually termed *gobblers*, associate in parties numbering from ten to one hundred, and seek their food apart from the females; whilst the latter either move about singly with their young, then nearly two-thirds grown, or—in company with other females and their families—form troops, sometimes consisting of seventy or eighty individuals. They are all intent on avoiding the old males, who, whenever opportunity offers, attack and destroy the young by repeated blows on the skull. All parties, however, travel in the same direction, and on foot, unless they are compelled to seek their individual safety by flying from the dog of the hunter, or their progress is impeded by a large river. When about to cross a river, they select the highest eminences, that their flight may be the more certain; and here they sometimes remain for a day or more, as if for the purpose of consultation, or to be duly prepared for so hazardous a voyage. During this time the males gobble obstreperously, and strut with extraordinary importance, as if they would animate their companions and inspire them with hardihood. The females and young also assume much of the pompous air of the males, the former spreading their tails and moving silently around. At length the assembled multitude mount to the tops of the highest trees, whence, at a signal note from a leader, the whole together wing their way towards the opposite shore. Immediately after these birds have succeeded in crossing a river, they for some time ramble about without any apparent unanimity of purpose, and a great many are destroyed by the hunters, though they are then least valuable.

When the turkeys have arrived in their land of abundance, they disperse in small flocks, composed of individuals of all ages and sexes intermingled, who devour all the mast as they advance: this occurs about the middle of November. It has been observed that, after these long journeys, the turkeys become so familiar as to venture on the plantations, and even approach so near the farm-houses as to enter the stables and corn cribs in search of food. In this way they pass the autumn and part of the winter. During this season great numbers are killed by the inhabitants, who preserve them in a frozen state in order to transport them to a distant market.

Early in March they begin to pair. The sexes roost apart, but at no great distance, so that when the female utters a call, every male within hearing responds, rolling note for note, in the most rapid succession; not as when spreading the tail and strutting near the hen, but in a voice resembling that of the tame turkey, when he hears any unusual or frequently repeated noise. Where the turkeys are numerous, the woods, from one end to the other, sometimes for hundreds of miles, resound with this remarkable noise, uttered responsively from their roosting places. This is continued for about an hour; and, on the rising of the sun, they silently descend from their perches, and the males begin to strut, as if to win the admiration of their mates. Their process of approach to the females is remarkably pompous and ceremonious; and, in its course, the males often encounter one another and desperate battles ensue, when the conflict is only terminated by the flight or death of the vanquished. With the hen whose favour is thus obtained the male is mated for the season, though he does not hesitate to bestow his attentions on several females whenever an opportunity offers. One or more females, thus associated, follow their favourite and rest in his immediate neighbourhood, if not on the same tree, until they begin to lay, when they shun their mates, in order to save their eggs, which the male uniformly breaks if in his power. At this period the sexes separate, and the males, being much emaciated *, retire and conceal themselves by prostrate trees, in secluded parts of a forest, or in the almost impenetrable privacy of a cane-brake. By thus retiring, using very little exercise, and feeding on peculiar grasses, they recover their flesh and strength, and when this object is attained again congregate and re-commence their rambles.

About the middle of April, when the weather is dry, the female selects a proper place in which to deposit her eggs, secured from the encroachment of water, and as far as possible concealed from the watchful eye of the crow. The nest is placed on the ground, either on a dry ridge, in the fallen top of a dead leafy tree, under a thicket of sumach or briars, or by the side of a log: it is of a very simple structure, being composed of a few dry leaves. In this receptacle the eggs are deposited, sometimes to the number of twenty, but more usually from nine to fifteen; they are like those of the domestic bird.

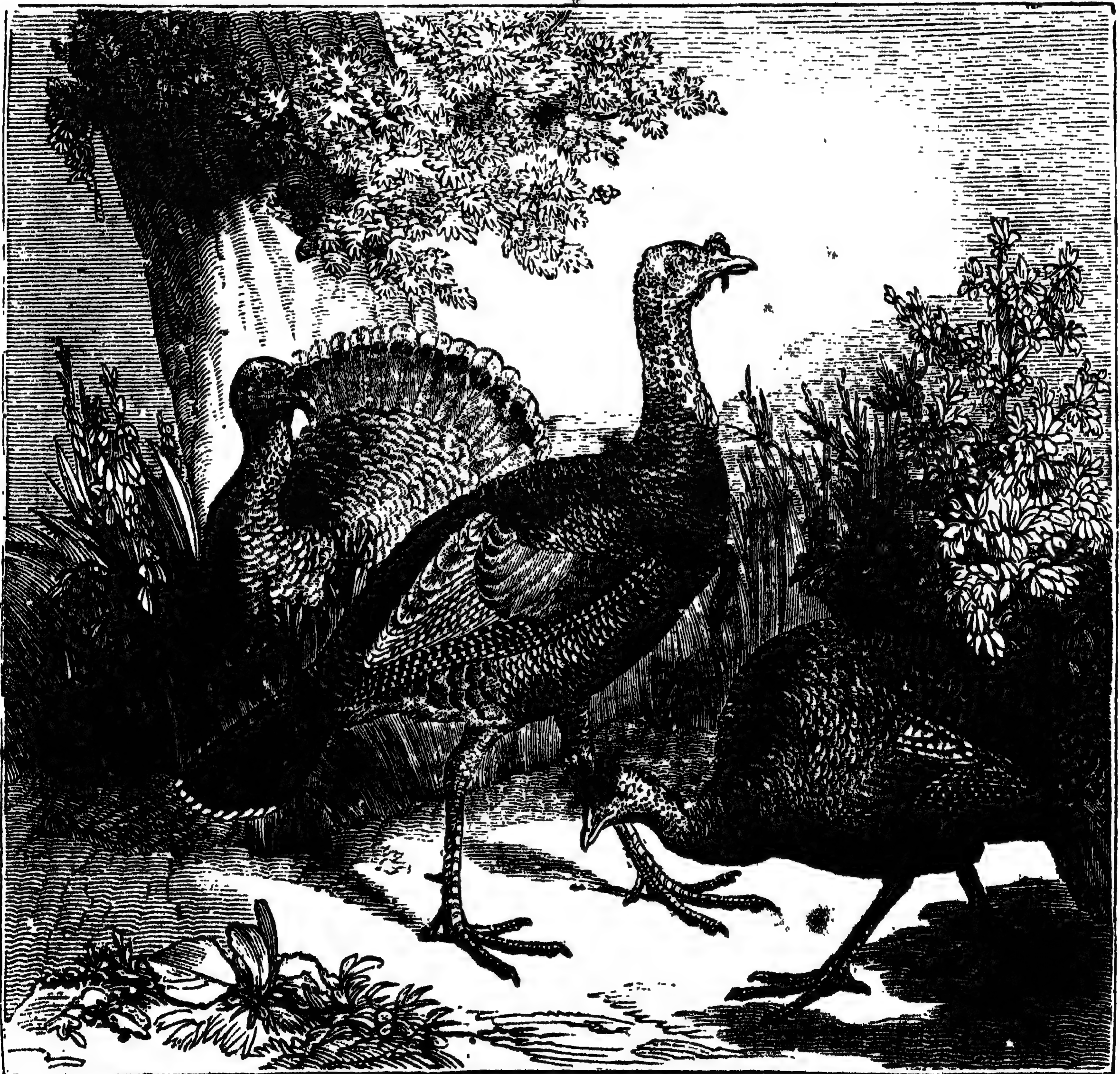
The female uses great caution in the concealment of her nest: she seldom approaches it twice by the same route; and on leaving her charge, she is very careful to cover the whole with dried leaves in such a manner as to make it very difficult even for one who has watched her motions to indicate the exact spot. Nor is she easily driven from her post by the approach of apparent danger; but if an enemy appears, she crouches as low as possible and suffers it to pass. They seldom abandon their nests on account of being discovered by man; but should a snake or other animal suck one of the eggs, the parent leaves them altogether. If the eggs be removed she again seeks the male and re-commences laying, though otherwise she lays but one set of eggs during the season. Several turkey-hens sometimes associate, perhaps for mutual safety, deposit their eggs in the same nest, and rear their broods together. Mr. Audubon once found three females sitting on forty-two eggs. In such cases the nest is commonly guarded by one of the parties, so that no crow, raven, or even polecat dares approach it. The mother will not forsake her eggs, when near hatch-

* The extraordinary leanness of this bird, at particular seasons of the year, of which this is one, has become proverbial in many Indian languages. An Omawhaw who wishes to make known his poverty says, "Wah pawne zezecah ha go ba;"—I am as poor as a turkey in summer.

ing, while life remains, she will suffer an enclosure to be made around and imprison her rather than abandon her charge.

As the hatching generally occurs in the afternoon and proceeds but slowly, the first night is commonly spent in the nest; but afterwards the mother leads them to elevated dry places, as if aware that humidity, during the first few days of their life, would be dangerous to them, they having then no other protection than a delicate, soft, hairy down. In rainy seasons wild turkeys are scarce, because when completely wetted the young rarely survive. At the expiration of about two weeks the young follow their mother to some low, large branch of a tree where they nestle under her broadly curved wings. The time then approaches when they seek the open ground or prairie land during the day in search of berries and grasshoppers, thus securing a plentiful supply of food and enjoying the genial influence of the sun. The young turkeys now grow rapidly, and in the month of August, when several broods flock together and are led by their mothers into the forest, they are stout, and able to secure themselves from the unexpected attacks of their enemies, by rising quickly from the ground and reaching with ease the upper limbs of the tallest tree.

It is rather surprising that, though the introduction of this bird into Europe is comparatively modern, its origin has been so much lost sight of, that eminent naturalists of the last century expressed themselves with great uncertainty concerning its native country. Thus Belon, Aldrovand, Gessner, Ray, and others, thought that it came originally from Africa and the East Indies, and endeavoured to recognize it in some of the domestic birds of the ancients. But its American origin is now clearly ascertained. This bird was sent from Mexico to Spain early in the sixteenth century; and from Spain it was introduced into England in 1524. Since that period they have been bred with so much care, that in England, as we read in ancient chronicles, their rapid increase rendered them attainable at country feasts, where they were a much esteemed dish, so early as 1585.



[Wild Turkeys.]

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BASALTIC ROCKS AND CASCADE OF REGLA.

(*From Humboldt's 'Vues des Cordillères.'*)



[View of the Basaltic Rocks and Cascade of Regla.]

In the 'Penny Magazine,' No. 29, we gave an account of the curious basaltic rocks known by the name of the Cave of Fingal, in the island of Staffa, one of the Hebrides. Humboldt, in his fine work, 'Vues des Cordillères,' has given a brief description, with a spirited representation, of very similar rocks in Mexico. It cannot but be interesting to trace the identity of form between the basalts of Regla, represented in the preceding wood-cut, and those of Fingal's Cave and the Giant's Causeway. The smallest accidents observed in the columned rocks of Europe are found again in this group of Mexican basalts. So striking an analogy of structure leads one to suppose that the same causes have acted under all climates and at very different epochs.

The little cascade of Regla is found to the north-east of Mexico, at the distance of twenty-five leagues, between the celebrated mines of Real del Monte and the mineral waters of Totonilco. A small river, which was used to work the mills for breaking and amalgamating the metals at Regla, winds its way among the groups of basaltic columns. The sheet of water which precipitates itself is rather considerable, but the fall is not more than from twenty-one to twenty-four feet. The surrounding rocks, which in their assemblage bring to mind the cave of Fingal at Staffa, the contrasts of the vegetation, and the solitude and savage aspect of the place, render this little cascade extremely picturesque. The sides of the ravine elevate themselves in basaltic columns, which are more than ninety feet in height, and upon which appear clumps of the *cactus* and of the *yucca filamentosa.*

The greater part of the columns of Regla are perpendicular; nevertheless, some are observed with an inclination of 45° to the east; and, at a greater distance, there are some horizontal. Each group, at the time of its formation, appears to have followed particular attractions. The prisms repose upon a layer of clay under which basalt is also found: in general this is superposed at Regla upon the porphyry of Real del Monte, whilst a rock of compact chalk serves as a base to the basalt of Totonilco. All this basaltic region is elevated about six thousand feet above the level of the ocean.

MINERAL KINGDOM.—Section 14.

Organic Remains.—(*Concluded.*)

In a former section we gave figures and descriptions of the cornu ammonis, and some other extinct animals of the older strata, because they are unlike anything we are now accustomed to see among living species. But although the distinctive characters of the fossil shells of the tertiary deposits are very marked in the eyes of a zoologist, they present to the general reader no forms which would strike him as uncommon; we shall therefore not stop to describe any of these, and, for the same reason, may pass over the fishes, crustacea, insects, and plants. But there are circumstances connected with the occurrence of the bones of land quadrupeds in the tertiary deposits so curious and interesting that we must not omit noticing some instances at least; more especially as they afford striking proofs of revolutions of the earth's surface long before the apparent existence of man, but, at the same time, the most recent in the series of geological changes. We shall begin with the earliest of the tertiary deposits.

Eocene Period.—One of the most extensive formations belonging to this period occurs around Paris. That capital is situated in a kind of trough of vast dimensions, formed by chalk hills rising around it on every side; and in that hollow there is a great accumulation of tertiary strata. From the form of the country, this deposit has been called by geologists the Paris Basin. By a singular coincidence the capital of England also stands in a hollow surrounded by chalk hills, and filled with similar tertiary deposits, and this has been called the London Basin. In both, but particularly in the Paris Basin, besides innumerable marine and fresh-water shells, fossil bones of extinct quadrupeds and birds have been found in great quantities. It was the almost daily disinterment of such bones in the stone-quarries around Paris, together with the large collections of them in the museums of that capital, which first led the celebrated Cuvier's attention to the subject, in which he afterwards so eminently distinguished himself by his splendid volumes on 'Fossil Bones.' This work has opened to geologists an entirely new field of observation, and established some of the most important truths at which we have arrived in the physical history of the earth.

The Paris Basin is about one hundred and eighty miles in a direction from N.E. to S.W., and ninety from E. to W. It is composed of a series of beds, the general arrangement of which is as follows:—

A. Above the chalk, but only partially, a deposit of plastic or potter's clay and sand, containing fresh-water shells, with accumulations of vegetable matter in that altered state called lignite, and which, in a previous section, we have described as being intermediate between peat and coal.

B Coarse limestone, often very sandy, and passing into sandstone, and both abounding in marine and fresh-water shells, containing portions of palm-trees, as well as others of the dicotyledonous class. Thick beds of gypsum or Paris-plaster stone, containing land and fluviatile shells, fragments of palm-trees, and a great number of skeletons and detached bones of quadrupeds, birds, fresh-water fish, crocodiles, tortoises and other land and river reptiles.

C Thick beds of sand and sandstone, without lime stone, containing shells, not in great abundance, *and exclusively marine.*

D. Calcareous marls interstratified with beds of flint and flinty nodules. From the larger masses of these flinty or siliceous portions they make the celebrated Paris mill-stones. These beds contain numerous fresh-water shells and a few plants.

The skeletons are found in the gypsum beds of the series B; they are usually isolated, and entire even in their most minute parts. About fifty species of quadrupeds have been discovered, four-fifths of which belong to a division of that order of animals called *Pachydermata*, (the thick-skinned, from *pachus*, Greek for thick, and *derma*, a skin or hide,) which contains at present only four living species, namely, three tapirs, an animal resembling a pig, and the daman of the Cape of Good Hope. This tribe of quadrupeds inhabit low plains and marshes, and the banks of rivers and lakes. There have been found also, in the same beds, bones of extinct species of the fox, dormouse, squirrel, and opossum, and about ten species of birds.

There is not so great a variety in the mineral structure of the tertiary strata of the London Basin as in that of Paris. Clay is the most prevalent, and it sometimes exceeds seven hundred feet in thickness: above it, there is a deep and extensive deposit of sand. No remains of terrestrial animals have yet been found in either of those beds, but skeletons and scattered bones of crocodiles and turtles have been occasionally met with. A series of tertiary strata belonging to the Eocene period, and very nearly resembling those in the basins of Paris and London, occurs in the Isle of Wight. Very perfect remains of tortoises and the teeth of crocodiles have been found in some of the beds; and in a limestone-quarry at Binstead some teeth belonging to animals similar to those entombed in the gypsum strata of Paris.

Miocene Period.—A series of deposits, possessing characters which point out an epoch of formation distinct

from, and probably long subsequent to, that of the strata lying immediately above the chalk, have been found in Touraine, the valley of the Loire, and several parts of the South of France, near Turin, in Piedmont, around Vienna, in Hungary, and in Poland. These contain bones of extinct species of the elephant, rhinoceros, hippopotamus, horse, stag, pig, and of two quadrupeds belonging to extinct genera, called by Cuvier Palacotherium and Anthracotherium. In some situations the bones of the latter animal have been found in deposits of the coaly matter called lignite, and in those cases they are frequently converted into a substance like coal. These remains of terrestrial quadrupeds are occasionally met with having corals and shells growing upon them, so that they must have been transported to the sea and have lain there for some time before they were enveloped in the mud and sand which was afterwards to be consolidated into stone and raised above the surface of the water. They are also intermingled with marine shells, and with bones of animals of the whale tribe, namely, the lamantin, morse, sea-calf and dolphin. In the volcanic districts of Auvergne, in the very centre of France, vast beds of gravel and loose soil, containing organic remains which identify them with the Miocene period, lie between layers of ashes and other volcanic products of great thickness. The bones of an extinct animal of great size, resembling the elephant, called the mastodon, have been found in that gravel; together with those of extinct species of elephant, rhinoceros, hippopotamus, ox, deer, boar, otter, beaver, hare, and water-rat, and those associated with bones of bears, tigers, hyænas and wolves. In the adjoining country of Velay, bones belonging to the same animals have been met with in a layer of volcanic ashes, which lies between two beds of solid lava. In the upper part of the valley of the Arno, in Italy, not far from Florence, there is a great accumulation of tertiary strata of this period, which must have been deposited in an extensive fresh-water lake. They contain the bones of most of the land animals above mentioned; and the Italian geologist, Brocchi, relates that the quantity of fossil bones is so great that the peasants, before they found out that they were valuable as objects of curiosity, used to make palisades, for fencing in their gardens, of the thigh bones and legs of elephants, dug from the soil around their dwellings.

Older Pliocene Period.—The most extensive deposit belonging to this period occurs in the northern part of Italy, in Tuscany, and as far south as Rome. The central mountain range of the Apennines is flanked by hills of marl, yellow sand, and gravel, generally low, but sometimes rising to the height of two thousand feet. These tertiary beds abound in marine shells, and in the remains of land quadrupeds, and of marine mammalia, or the whale tribe, so that it is evident the bones of the land animals were transported by running water to the bottom of the sea; and that they lay there a long time has been proved by the discovery, in the marl, of the thigh-bone of an elephant, with oyster-shells adhering to it. A long list might be given of the land animals of extinct species, the remains of which have been dug out of these sub-apennine hills.

Newer Pliocene Period.—This most modern of the groups of the tertiary series has been established by Mr. Lyell, in consequence of his observations in Sicily, where he discovered extensive deposits of limestone and marl in the Val di Noto, which rise in some places to the height of three thousand feet above the level of the sea, containing shells, which prove the strata to have been deposited long subsequently to the sub-apennine hills. These shells are in a very perfect state of preservation, and are, for the most part, species identical with those now living in the adjacent sea. He mentions other deposits of the same age in Italy and the Morea. To this period belong many accumulations of loose gravel, which cover vast tracts of country in most parts of the globe, and which are called by some geologists diluvial gravel and diluvium, because they suppose them to have been produced by some sudden flood passing over the earth, *diluvium* being Latin for a deluge.

This gravel contains, in many places, immense quantities of the bones of extinct species of quadrupeds, especially the elephant and rhinoceros; for remains of those animals have been met with in such situations in almost every country of the world. Indeed the quantity of elephants' bones is something quite extraordinary, even as far north as the frozen regions of Siberia. A very full and interesting account of the fossil remains of this animal will be found in the seventh volume of the 'Library of Entertaining Knowledge,' c. xiv. and xv. Eight different species of the extinct quadruped resembling the elephant, which we have mentioned above, called the mastodon, have been discovered; and the gigantic bones of a still more extraordinary quadruped, the megatherium, now no longer known to exist in a living state, have been disinterred from the banks of a river in South America. The greatest accumulations of the bones of the mastodon are on the western side of the Appalachian mountains of North America, near the banks of the Ohio river, at a place called Big Bone Lick, and in other parts of the State of Kentucky; and they have likewise been found on the eastern side of the mountains, near the Hudson River. The animal resembled an elephant, but one of gigantic size, for tusks above twelve feet in length have been discovered. Along with the bones of the mastodon were found those of the elephant, rhinoceros, horse, ox, and stag. The bony structure of that clumsy monster, the megatherium, prove it to have belonged to the sloth tribe. An almost complete skeleton of it was dug up about forty five years ago, near Buenos Ayres, and was sent by the viceroy of the province to the Royal Cabinet of Madrid, where it now is; and, very lately, several bones were discovered in the same district, and sent to England by the British consul. The animal must have been of the size of a rhinoceros; and it was covered with a coat of mail something like that of the armadillo. It must have lived upon vegetable food, and probably dug up roots with its claws, which are of an enormous size. Remains of another species of the same quadruped, about the size of an ox, and which has been called the megalonyx, have been found in different parts of North America.

One of the most remarkable circumstances connected with the fossil remains of quadrupeds is their accumulation in caverns in various parts of the world. Caves, often of very considerable dimensions, are common in all countries where limestone hills exist; and many of those which have hitherto been examined appear to have been, in ancient times, the retreats of wild beasts, and other animals. The floor is usually covered with a stony incrustation gradually formed by petrifying waters running in the bottom of the cave, and filtering through its sides. On breaking through the crust, or stalagmite, as it is termed by geologists, we come to loose earth, of variable depth, containing scattered bones and fragments of bone, belonging to extinct species of quadrupeds, and, what is very remarkable, not of one or two, but of many kinds, and such as could never have lived together in one den, or even in very near neighbourhood. Thus in Kirkdale cave, near Malton in the East Riding of Yorkshire, which, a few years ago was explored and described by Dr. Buckland, there were found the bones of bears, tigers, hyænas, wolves, and foxes, mixed up in one common mass with those of the elephant, rhinoceros, hippopotamus, horse, ox, deer, hare, rabbit, rat, mouse, and several birds, such as pigeons, larks, ducks, ravens, and snipes. All these were not only mingled together, but many of them had evidently been gnawed. From the great proportion of hyæna's bones and the intermixture

of its peculiar hard earthy dung, it is thought that those animals must have inhabited the cave for a very long period, and that the bones of the other animals are the remains of living prey, or dead carcasses dragged by those ravenous beasts into their den. In whatever way we seek to explain the manner in which the bones were collected in the cave, there still remains the remarkable fact that, at a remote period, probably long before it was inhabited by man, but after the land had assumed its present form, Great Britain swarmed with wild beasts similar to those which now roam in the forests and swamps of Africa.

The brief sketch which we have now completed of some of the most remarkable facts connected with the history of fossil organic remains, can hardly have failed to excite feelings of wonder and of no ordinary interest in the minds of those to whom the subject of geology is wholly new, and who were not prepared to learn that such extraordinary facts should have been brought to light, out of our stone quarries and coal mines. They will have perceived that there is the most indisputable evidence of our continents and every portion of dry land having been raised up from the bottom of the sea; and of their having taken their present forms after many revolutions, during which land and water have repeatedly changed places on the surface of the earth. There cannot be a doubt that there was a time when the place now occupied by Great Britain was a deep sea, surrounded by other land; on which grew, in a climate as warm as the West Indies, tree ferns and palms, which, in the natural course of decay, were carried into the adjoining sea, and accumulated there for ages to form our strata of coal. The bed of the sea must have been then broken up and heaved above the surface of the waters, when a new state of things prevailed in the vegetable and animal creation, the sea swarming with enormous saurian reptiles. The land must afterwards have been subjected to repeated submersions and elevations before Great Britain rose from out the deep in its present form, to become, after a necessarily long preparatory interval, a dwelling-place for tigers, hyænas, bears, hippopotami, and elephants. How many ages those wild beasts, of species too that no longer exist, were the sole inhabitants of our island, it is impossible for us to form any conjecture. We know for certain that not a fragment of a fossil *human* bone has ever been seen.

We have now completed that general view of the structure of the crust of the globe which, as we stated in our first section, we considered to be a necessary introduction to our intended accounts of the natural history of those mineral substances which enter into the business of common life. Our sections have necessarily appeared at distant intervals, and it will therefore be convenient to such of our readers as wish to go over the subject again with less interruption, to state that the preceding Sections have appeared in Nos. 50, 51, 56, 59, 61, 66, 68, 71, 76, 79, 92, 94, and 97. Our sketch has been brief, and may appear to some of our readers very incomplete; but it must be remembered that to have gone into the subject at length would have been inconsistent with the plan of our publication. Our object has been to render our descriptions of the manner in which mineral productions are obtained from the interior of the earth more intelligible to the general reader; and in doing so, to awaken, at the same time, his attention to those important facts in the history of the earth we inhabit, which the science of geology has brought to light.

Ferocity of Hawks.—We stopped one very sultry day about noon to rest our horses, and enjoy the cooling shade afforded by a clump of sycamore trees, with a refreshing draught from an adjoining spring. Several large hawks were flying about the spot, two of which we brought down. From their great size, immense claws, and large hooked beaks, they could have easily carried off a common-sized duck or goose. Close to our resting-place was a small hill, round the top of which I observed the hawks assemble; and judging that a nest was there, without communicating my intention to any of the party, I determined to find it out. I therefore cautiously ascended the eminence, on the summit of which I perceived a nest larger than a common-sized market basket, formed of branches of trees, one laid regularly over the other, and the least of which was an inch in circumference. Around it were scattered bones, skeletons and half-mangled bodies of pigeons, sparrows, humming-birds, &c. Next to a rattlesnake and a shark, my greatest aversion is a hawk; and on this occasion it was not diminished by observing the remains of the feathered tribe, which had, from time to time, fallen a prey to their voracious appetite. I therefore determined to destroy the nest, and disperse its inhabitants; but I had scarcely commenced the work of demolition with my dagger, when old and young flew out and attacked me in every direction, but particularly about my face and eyes; the latter of which, as a punishment for my temerity, they seemed determined to separate from their sockets. In the mean time I roared out lustily for assistance, and laid about me with the dagger. Three men promptly ran up the hill, and called out to me to shut my eyes, and throw myself on the ground, otherwise I should be shortly blinded, promising in the mean-time to assist me. I obeyed their directions; and just as I began to kiss the earth, a bullet from one of their rifles brought down a large hawk, apparently the father of the gang. He fell close to my neck, and in his expiring agonies made a desperate bite at my left ear, which I escaped, and in return gave him the *coup de grace*, by thrusting about four inches of my dagger down his throat. The death of their chieftain was followed by that of two others, which completely dispersed them; and we retired after breaking up their den.—*Ross Cox's Adventures on the Columbia River.*

Wolves.—These destructive animals annually destroy numbers of horses, particularly during the winter season, when the latter get entangled in the snow; in which situation they become an easy prey to their light-footed pursuers, ten or fifteen of which will often fasten on one animal, and with their long fangs in a few minutes separate the head from the body. If, however, the horses are not prevented from using their legs, they sometimes punish the enemy severely: as an instance of this, I saw one morning the bodies of two of our horses which had been killed the night before, and around were lying eight dead and maimed wolves; some with their brains scattered about, and others with their limbs and ribs broken by the hoofs of the furious animals in their vain attempts to escape from their sanguinary assailants.—*Ross Cox's Adventures on the Columbia River.*

These wolves, the author states, seldom venture to attack man, and he relates more than one instance of their being driven away by a single traveller with a stick. The wolves of Europe are much more ferocious, and the following description from 'Thomson's Seasons' is borne out, in its principal facts, by the testimony of unquestionable witnesses:—

"By wintry famine rous'd from all the tract
Of horrid mountains which the shining Alps,
And wavy Apennine, and Pyrenees,
Branch out stupendous into distant lands,
Cruel as death, and hungry as the grave!
Burning for blood! bony, and gaunt, and grim!
Assembling wolves in raging troops descend,
And, pouring o'er the country, bear along,
Keen as the north wind sweeps the glossy snow.
All is their prize. They fasten on the steed,
Press him to earth, and pierce his mighty heart;
Nor can the bull his awful front defend,
Or shake the murdering savages away.
Rapacious, at the mother's throat they fly,
And tear the screaming infant from her breast.
The god-like face of Man avails him nought.
E'en beauty, force divine! at whose bright glance
The generous lion stands in soften'd gaze,
Here bleeds a hapless, undistinguish'd prey."

Winter v. 389—407.

BOAR-HUNTING.



[Wild Boar-Hunting.]

THE wild boar, which, according to Cuvier, is the original from which have sprung all the common varieties of the domestic hog, seems to have abounded at one time in nearly every country of Europe and Asia, and also in some parts of Africa. In America it was unknown until introduced by Europeans; for the Peccary, although sometimes called the Mexican hog, appears to be indisputably a distinct animal.

In the 'Description of London,' by Fitzstephen, written in the reign of Henry II., in the latter part of the twelfth century, it is stated that the forest by which London was then surrounded was frequented by boars as well as various other wild animals. In Scotland a tract of country now forming one of the extremities of the county of Fife was anciently called Muckross, which in Celtic signifies the Boar-promontory. The tradition is, that it was famous as a haunt of boars. A district forming a portion of it is in old writings designated by the name of the Boar Hills, which has now been corrupted into Byre Hills. It lies in the vicinity of St. Andrew's, in the cathedral church of which city it is said that there were to be seen before the Reformation, attached by chains to the high altar, two boar's tusks of the extraordinary length of sixteen inches each, the memorials of an enormous brute which had been slaughtered by the inhabitants after having long infested the neighbourhood. See 'Martines Reliquiæ Divi Andreæ,' and Sir Robert Sibbald's 'History of Fife and Kinross.'

In every country where the wild boar was found, the hunting of the animal was a favourite sport. In ancient times, it was practised equally by the civilized Romans, and by our own barbarous forefathers in Germany, and in this island. In this country the wild boar was reckoned among the ordinary "beasts of venery," down to a comparatively recent period. In Strutt's 'Sports and Pastimes of the People of England' are given two engravings illustrative of this subject; one from a manuscript of the ninth century, representing a Saxon chieftain, attended by his huntsmen and a couple of hounds, pursuing the wild swine in a forest; and the other showing the manner in which the animal was attacked in the fourteenth century. There is a famous old work called the 'Book of St. Alban's,' from having been first printed in 1486 at the Abbey there, being a series of metrical treatises on hunting, hawking, angling, and heraldry, written in the fourteenth century, by Dame Juliana Berners, prioress of the nunnery of Sopwell The following is her enumeration of the different sorts of animals that were then hunted :—

"Wheresoever ye fare by frith or by fell,
My dear child take heed how Tristam * do you tell
How many manner beastis of venery there were;
Listen to your dame, and she shall you lere:—
Four manner beastis of venery there are;
The first of them is the hart, the second is the hare,
The boar is one of tho, the wolf and not one mo.
And where that ye come in plain or in place,
I shall you tell which been beasts of enchase;
One of them is the buck, another is the doe,
The fox, and the marteron, and the wild roe;
And ye shall, my dear child, other beasts all,
Whereso ye them find, Rascal ye shall them call,
In frith or in fell, or in forest, I you tell."

In a well-known old French treatise 'On Hunting and Falconry,' written in the sixteenth century by Jacques du Fouilloux, one of the chapters (the 46th) is devoted to the subject of the properties and mode of hunting the boar. The animal, this writer says, ought not to be accounted among beasts to be chased by common hunting dogs, but is fit game rather for mastiffs and their like. Dogs, he argues, accustomed to hunt the boar soon lose their delicacy of smell, and their capacity of tracking other game, from being in this sport accustomed to see the object of their pursuit so near them, and, as he expresses it, to have a strong sensation of their beast, ("*avoir grand sentiment de leur beste.*") Besides, the ferocity and power of the animal are such,

* Tristam was the title, or the name of the author, of an old work, now lost, which seems in former times to have been the standard authority on the subject of hunting.

that in our author's opinion it is exposing dogs, valuable on account of their scent rather than their strength, to far too great a risk to employ them in this sort of sport. The boar, he says, will kill a dog with a single blow from his tusks; and when he turns upon a pack, generally selects the strongest, and will lay several of them dead in as many instants. He speaks of one he saw, which, while pursued by fifty dogs, suddenly turned upon them, and not only slew six or seven of them, but wounded so many more, that only ten of the whole number came home uninjured.

Boar-hunting, it may be conceived from these facts, was a sport by no means unattended with danger to the hunter himself, as well as to his dogs. As practised during the middle ages, the animal, when brought to a stand, was attacked, sometimes on horseback and sometimes on foot; and either by swords which were struck into his flesh, or by strong spears which were protruded against him till he either rushed upon the point, or exposed himself to a thrust from the person by whom the weapon was held. The parts into which it was attempted to plunge the spear, with the view of inflicting the most deadly wounds, were the forehead, between the eyes, and the breast, immediately under the shoulder-blade. Our engraving presents a spirited sketch of this mode of attack. It sometimes happened, however, that the boar would, by a sudden movement, contrive to seize the haft of the protruded spear between his powerful jaws, in which case his assailant was exposed to the most imminent danger of destruction. One crunch was sufficient to grind the wood to fragments; and the next instant, unless some one was by to renew the attack, the enraged beast had his unarmed enemy upon the ground under his hoofs, and was ripping him up with his tusks. When horses were employed, they were frequently wounded in this way.

Boar-hunting is still a favourite amusement in India; but there the sport appears to be always followed on horseback, and the animal is attacked by long spears or javelins, which are not usually thrust into his flesh, the hunter retaining a hold of the weapon, but are lanced at him from a distance of twenty or thirty yards, as he flies before his mounted pursuers. The Indian wild hog does not seem to be quite so ferocious an animal as either the African or the European species. Ample and interesting details and anecdotes on hog-hunting in India may be found in the works upon Indian field sports by Daniel, Williamson, and Johnson. Among other anecdotes, Mr. Johnson relates the following:—"I was one of a party of eight gentlemen on a sporting excursion at Hye, near the city of Patna, on the banks of the Soane river. Returning one morning from shooting, we met with a very large boar in a rhur*, which we did not fire at or molest, as several of the gentlemen were very fond of hunting them, and we had no spears with us. The next morning we all sallied forth in search of him, and, just as we arrived at the spot where we saw him the day before, we discovered him, at some distance, trotting off towards a grass jungle, on the banks of the river: we pressed on our horses as fast as possible, and were nearly up with him, when he disappeared all at once; our horses were then nearly at their full speed, and four of them could not be pulled up in time to prevent their going into a deep branch of the river, the banks of which were at least fourteen or fifteen feet high;—luckily for us there was no water in it, or anything but fine sand, and no person was hurt. One of the horses, which was very vicious, got loose, attacked the others, and obliged all the gentlemen to quit them, and walk to their tents, where one of the horses had arrived before them, and the rest were soon caught. A few days after this we went again early in the morning in pursuit of the same hog, and found him farther off from the grass jungle, in a rhur-field, from which, with much difficulty, we drove him into a plain, where he stood at bay, challenging the whole party, boldly charging every horse that came within fifty yards of him, grunting loudly as he advanced. I was then a novice in the sport, but I have never since seen any hog charge so fiercely. The horse I rode would not go near him, and when I was at a considerable distance off, he charged another horse with such ferocity that mine reared and plunged in such a violent manner as to throw me off: two or three others were dismounted nearly at the same time, and although there were many horses present that had been long accustomed to the sport, not one of them would stand his charge; he fairly drove the whole party off the field, and gently trotted on to the grass jungle, (foaming and grinding his tusks,) through which it was impossible to follow or drive him.

"The largest boar I have ever seen killed was extremely old and thin; he measured, in height to the top of the shoulder, forty-three inches, and his tusks were ten inches long. He was fierce, but showed little sport, owing to his taking shelter in a thick rhur-field, from which we could not drive him. Two very large greyhounds were slipped to him; one of them he instantly killed, and the other he severely wounded. A random spear, thrown by a gentleman who did not see him distinctly at the time, struck him in the head, and he fell dead without receiving any other wound."

In England there has been no boar-hunting for some ages. In France, however, where there are large tracts of forest which supply fuel to the towns, boars are not uncommon, although their ferocity is much diminished. At Chantilly, within forty miles of Paris, the late Prince of Condé (who died in 1830) kept a regular pack of hounds for hunting the boar. They were large and strong dogs, much resembling the English fox-hound, though more muscular and bony. The huntsman, in the summer of 1830, mentioned to some English gentlemen who visited this hunting-palace, that he had seen at one time, a few days previous, as many as fourteen wild pigs in the forest of Chantilly. Boar-hunting is still practised in some parts of Germany, but in a fashion which at once deprives the sport of its only redeeming quality—its adventurous character, and makes it more cruel and sanguinary than ever. The animals who are to be destroyed are first enclosed in a sort of pen, from which they can only escape by one opening, and when they attempt to rush out, are slaughtered there by the hunters, who sit on horseback, armed with spears and swords, with which they have only to strike them till they expire.

We may remark that, in some countries, even the domesticated hog retains a great deal of the fierceness which characterizes the wild breed. Mr. Lloyd, in his 'Field Sports of the North of Europe,' relates the following adventure, which befel him near Carlstad in Sweden:—

"Towards evening, and when seven or eight miles from home, we came to a small hamlet, situated on the recesses of the forest; here an old sow and her progeny made a determined dash at a brace of very valuable pointers I at that time had along with me, and who naturally took shelter behind us. My man had a light spear in his hand, similar to those used by our lancers; this I took possession of; and directing him to throw the dogs over a fence, in the angle of which we were cooped up, I placed myself between the dogs and their pursuers. The sow, nevertheless, pressed forward; and it was only by giving her a severe blow across the snout, with the butt-end of the spear, that I stopped her further career. Nothing daunted, however, by this reception, she directed her next attack against myself;

* "Rhur is a species of lupine, or pulse, which grows to the height of from four to six or seven feet; the seeds are eaten by the natives of India, and are also given to the cattle.

when, in self-defence, I was obliged to give her a home-thrust with the point of the spear. These attacks she repeated three several times, and as often got the spear up to the hilt in either her head or neck. She then slowly retreated, bleeding at all pores. So savage and ferocious a beast I never saw in my life. In the fray I broke my spear, which was as well, for it was by no means strong enough to answer the purpose for which it was intended . . . This was not a solitary instance of the ferocity of pigs. It was the same throughout Sweden; for, whenever they caught sight of my dogs, they generally charged; and, if they came up with them, would tumble them over and over again with their snouts."

MARABOUTS OF AFRICA.

"The language of the Ghioloffs is diffused nearly over the whole of Senegambia; particularly the districts of Walo, Kaijor, Ghioloff, Salôm, Baôl, St. Lewis on the Senegal, and Goree. From not being a written language, it has no pretensions to literature. The people of Senegal are, however, to a certain extent acquainted with the use of letters, for many among them are able to read and write Arabic, though their knowledge of that tongue is but imperfect. It is this class who are known to Europeans by the name of *Marabouts*. They are in high esteem amongst their fellow-countrymen; and as it forms part of their profession to sell amulets and practise the healing art, they possess considerable influence over them. Some of the Ghioloffs are in high repute as minstrels, and earn a comfortable livelihood by entertaining parties with their songs. They are generally found in the retinue of the African chieftains, are the poets and virtuosi of that part of the globe, celebrate the exploits of departed heroes, and raise those into demi-gods who open their purse-strings to them. In this latter respect, they find so ready an ally in the excessive vanity of the Negro, that rather than not feast upon the exaltation of his own name, when its merits are discussed by a tickling melody and sonorous voice, he will strip himself of his last remaining rag and throw it into the lap of the enchanter. These manufacturers of unknown celebrities, though the companions of the great, and the presiding spirits over popular amusements, are, however, despised on all sides and cast out from society. No family will condescend to intermarry with them, nor are their bodies allowed to profane the common burial-ground. They accompany their strains with the notes of a species of guitar, formed out of one-half of a small oval basket, with a skin stretched across it; at one end, a wooden neck is fastened on, having horsehair strings run along it. They display some ingenuity in the invention of fables, riddles, and proverbs. We add the following as a specimen of the latter. 'By whom is the stranger first perceived, and yet denied a welcome? The top of the house.' 'What constitutes the silver of the wilderness? Gum, which resembles silver in brilliancy, and is the staple of Senegal.' 'What is it that respires, and yet is devoid of life? The breath.' 'Man advances but slowly, yet his spirit travels swiftly.' 'A single wolf will spoil a whole flock.' 'It is better to know thyself, than to be taught this knowledge by others.' 'Shut up thy vexation in thine own breast; this is better than to indulge a vengeful spirit.'"
—*Quarterly Journal of Education, No. XII.*

CITY OF NORWICH.

The annexed wood-cut presents a view of a part of the city of Norwich as seen from the south-west. In Camden, and most of our other old authorities, it is erroneously stated that Norwich stands on the river Yare. It stands, in fact, on the Wensum, which does not join the Yare till it has got a considerable way past Norwich. The Wensum flows through the town, the principal part of which, however, is on the south side of the river, occupying the summit and sides of a hill, which rises by a gentle ascent from the south and west, but is much more steep on the other two sides, which are terminated by the valley of the river. The whole of the city was, till lately, surrounded by a wall, which, when perfect, was adorned by forty towers and twelve gates. The line of circumvallation ran around the north part of the city in almost a circular sweep; but on the south it ended in a point, which turned round a little to the east. Norwich is about a mile and a half in length from north to south, and about a quarter of a mile less, measured in the opposite direction.

The prospect of the city, from a little distance, is both imposing and beautiful. The massive walls of the old castle, crowning the summit of the hill and forming the central object in the view, the lofty spire of the cathedral, and those of the numerous parish churches rising in all directions, give it an air of great magnificence. And, mixed with this architectural grandeur, is much more than the usual share of rural scenery to be found in populous cities, arising from the many large spaces of ground that are laid out as gardens or planted with fruit-trees. The declivity immediately around the castle, in particular, having been converted into gardens, forms a conspicuous and highly-ornamental ring of green, in the very centre of the crowd of houses. "Some authors," says Camden, "style this city an orchard in the city, or a city in an orchard, by reason of the great variety of gardens, and pleasant intermixture of houses and trees, so that the populousness of a city and the pleasures of the country seem to be united in one."

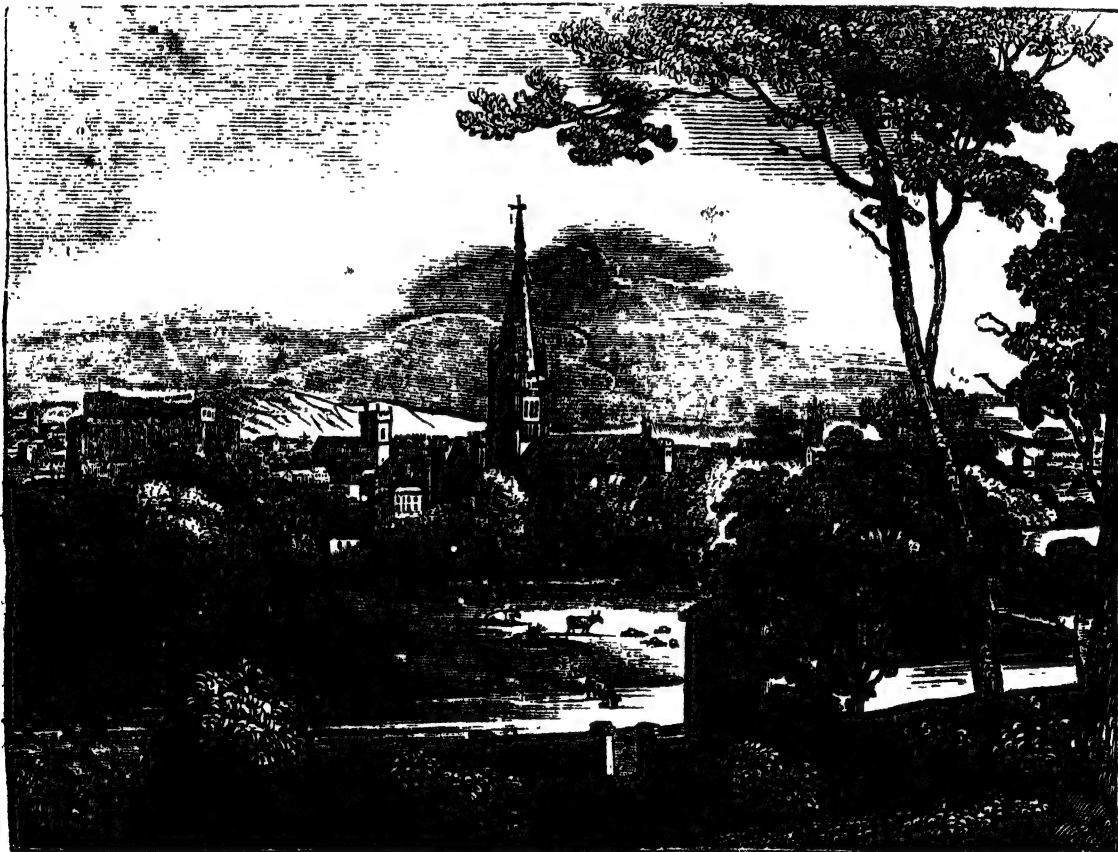
There is no reason to suppose that Norwich was either a British or a Roman settlement. The Romans, however, had a fortified station in this neighbourhood, in all probability at Caistor or Castor, a few miles south from Norwich. Castor seems to be merely the Latin *Castrum*, the name the Romans usually gave to their military settlements in the barbarous countries which they subjected to their dominion, and which, changed by the Saxons into *Caster* or *Chester*, we find in so many of our English names of towns that occupy the sites of these ancient fortified stations. Worcester, Winchester, Chester, are examples. The people of Norwich have a tradition that their city rose upon the decline of Castor, and was partly built with the materials of that old capital, according to the following rhyme which is still repeated:—

> "Castor was a city when Norwich was none,
> And Norwich was built with Castor-stone."

The name of Norwich is pure Saxon, and seems to signify no more than the northern town; although Mr. Blomefield, the learned historian of the county, interprets it—a northern situation on a winding river. The place, at any rate, appears to have risen into note soon after the establishment of the Saxons in England; and, about the middle of the seventh century, it became the capital of the kingdom of East Anglia, and the customary residence of the sovereigns of that state. It is probable that, soon after this, the first fortress was erected on the site of the present castle. No part of the existing building, however, is older than the eleventh century; and much of it is a good deal more modern.

The bishopric was founded about the year 630; but its original seat was not here, but at Dunwich. In 673, another bishopric was established at Elmham; and, in the course of the ninth century, that of Dunwich was suppressed. In 1075, the bishop's seat was again transferred to Thetford; and here it remained till 1094, when it was finally settled at Norwich, now become the most important town in the diocese. Soon after the building of the present cathedral was commenced; and a little to the south of the cathedral, there was also erected a priory, which was filled with Benedictine monks. Norwich had now become a great ecclesiastical capital. When 'Doomsday-Book' was compiled, it contained at least twenty-five parish-churches, and appears to have been a larger and more populous town than either Lincoln, Ipswich, Yarmouth, Cambridge, or Canterbury. It constituted, at this time, a hundred in itself; the city jurisdiction probably extending about a mile beyond the line of the walls afterwards erected.

It was the introduction of the woollen manufacture, however, in the middle of the fourteenth century, that established the wealth and eminence of Norwich. When the weavers, dyers, and dressers of woollen stuffs in the Netherlands, disgusted by the oppressive restrictions imposed upon their trades by the corporations of their native county, and, tempted by the advantages offered them by the wise policy of Edward III., came over in great numbers to England, they principally established themselves at Norwich and in the surrounding towns and villages. The increase in the number of the inhabitants of the city, which took place soon after this, must have been very great, if we can give credit to what we are told by Stowe, and other of our old historians, that, in the great plague of 1348, there perished in Norwich, between January and July, above 57,000 persons. It is true that, in that part of the county, the pestilence is represented as not having spared above one in ten of the population. The city, however, gradually recovered from this blow, and continued to flourish, as it had done before, till two centuries after, when the memorable insurrection, known by the name of Kett's Rebellion, broke out in 1549. The commonalty at this time had been made desperate by the oppressions of their superiors, and were ready to proceed to any extremities that held out a chance of releasing themselves from a yoke which they felt too burdensome to be longer borne. Kett, who was a tanner of Wymondham, easily collected many thousands of them while they were in this humour, and excited them to join him in an enterprise, the object of which seems to have been nothing less than the overthrow of all the established authorities of the kingdom. Like all other similar movements, however, that have ever been made by mere mobs, the attempt entirely failed, and only brought ruin upon its authors. Five thousand of the rioters were put to death, and Kett himself was hanged on the top of Norwich Castle. That city had suffered severely from the rebels, and seems indeed to have been reduced to a state of almost complete desolation from the pillage to which it had been subjected, and the numbers of its inhabitants that were butchered. It became, in consequence, a refuge for vagrants and other lawless characters; and in this condition, Roger Coke tells us, "it was thought so dangerous to the government, that, in the beginning of Queen Elizabeth's reign, it was often debated in council whether for this cause it should not be demolished." "But," he adds, "a better fate attended that noble city, through the wisdom of that great queen, and the cruelty of the Netherland persecution about twenty years after this time." He alludes to the new influx into England of the wool-workers of the Netherlands, about the year 1580, occasioned by the tyrannical government of the Duke of Alva. Like their predecessors in the reign of Edward III., these emigrants flocked chiefly to Norwich and its neighbourhood; and their industry, and the new processes the knowledge of which they brought along with them, soon restored the city to its former prosperity. From this time, although the weaving of silk has, to a great extent, superseded that of woollen stuffs, Norwich has continued to flourish as a great manufacturing town. The population, by the last census, was above 61,000, having increased from about 36,000 since 1811. It now contains, besides the cathedral, thirty-six parish-churches, and is adorned by many buildings and public institutions worthy of the wealth of its inhabitants and its eminence among the cities of England.



[South-West View of the City of Norwich.]

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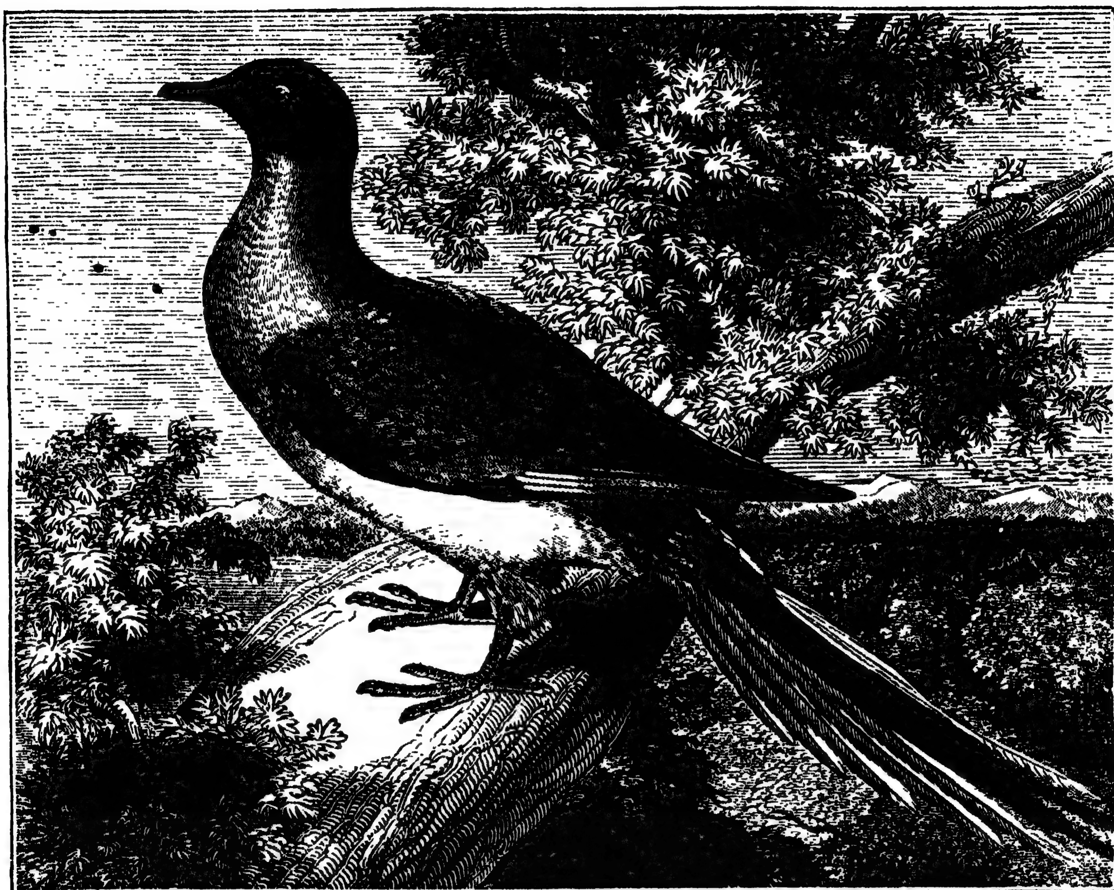
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THE PASSENGER-PIGEON.

(Abridged from 'Wilson's American Ornithology.')



[Passenger-Pigeon.]

This remarkable bird inhabits a wide and extensive region of North America, spreading over the whole of Canada, and extending to the Gulf of Mexico southward, while the Stony Mountains appear to limit its westward range. In the United States it occasionally visits and breeds in almost every quarter.

The passenger-pigeon is sixteen inches long and twenty-four in extent; and it is in this circumstance of size, and that of plumage, that we are chiefly to look for the distinguishing external difference between this and other species of the pigeon. A light slate colour predominates in the head and upper part of the neck, and a darker slate in the back, wings, and rump coverts. The throat, breast, and sides, as far as the thighs, are of a reddish hazel; the lower part of the breast and the thighs fade into a brownish red; and the belly and the vent are white. The lower part of the neck and sides are of a resplendent gold, green, and purplish crimson, the latter most predominant. The tail is long, and all the feathers taper towards the point; the two middle ones are plain, deep black; the other five on each side hoary white, lightest at the tips, and deepening into bluish near the basis. The bastard wing is black; the legs and feet are lake seamed with white. The female is about half an inch shorter than the male, and an inch less in extent;—she resembles the male generally in colour, but less vivid and more tinged with brown.

The most remarkable characteristic of these birds is their associating together, both in their migrations and during the period of incubation, in such prodigious numbers as almost to surpass belief, and which has no parallel among any other feathered tribes on the face of the earth with which naturalists are acquainted.

These migrations appear to be undertaken rather in quest of food than merely to avoid the cold of the climate. The passenger-pigeons are found lingering in the northern regions around Hudson's Bay so late as December; and their appearance is casual and irregular. As the beech-nut constitutes the chief food of this wild pigeon, in seasons when it is particularly abundant corresponding multitudes of pigeons may be confidently expected. It sometimes happens that when they have consumed the whole produce of the beech-trees in one extensive district, they discover another, at the distance of perhaps sixty or eighty miles, to which they regularly repair every morning, and return as regularly in the course of the day, or in the evening, to their place of general rendezvous, or, as it is usually called, the *roosting-place*. These roosting-places are always in the woods, and sometimes occupy a large

extent of forest. When they have frequented one of these places for some time, the appearance it exhibits is surprising. The ground is covered, to the depth of several inches, with their dung,—all the tender grass and underwood destroyed,—the surface strewed with large limbs of trees, broken down by the weight of the birds clustering one above another—and the trees themselves, for thousands of acres, killed as completely as if girdled with an axe. The marks of this desolation remain for many years on the spot; and numerous places could be pointed out where, for several years after, scarce a single vegetable made its appearance. When their roosting-places are first discovered, the inhabitants from considerable distances visit them in the night with guns, long poles, clubs, pots of sulphur, and various other instruments of destruction, and in a few hours fill many sacks and load their horses with them.

The breeding-place differs from the roosting-place in its greater extent. In the western countries these are generally in beech-woods, and often extend, in nearly a straight line, across the country for a very great way. One is mentioned in the State of Kentucky which stretched through the woods in nearly a north and south direction, was several miles in breadth, and said to be nearly forty in length. In this tract almost every tree was furnished with nests wherever the branches could accommodate them, a single tree frequently containing more than a hundred. At this place the pigeons made their first appearance about the 10th of April, and left it altogether, with their young, before the 25th of May.

The nest of the wild pigeon is formed of a few dried, slender twigs, carelessly put together, and with so little concavity that the young, when only half grown, can be easily seen from below. All accounts agree in stating that each nest contains only one young squab; but it is asserted that the pigeon breeds three or four times in the course of the same season. The young are so exceedingly fat, that the Indians, and many of the whites, are accustomed to melt down the fat for domestic purposes as a substitute for butter and lard.

As soon as the young are fully grown, and before they leave their nests, numerous parties of the inhabitants of the neighbouring country often come with waggons, axes, beds, cooking utensils, many of them accompanied by the greater part of their families, and encamp for several days in these immense nurseries. It is said that the noise in the wood is so great as to terrify the horses; and when a person speaks he finds it difficult to make himself heard without bawling in the ears of those whom he addresses. The ground is strewed with broken branches, eggs, and young squab pigeons which have been precipitated from above, and on which herds of hogs fatten themselves. Great numbers of hawks, buzzards, and sometimes the bald eagle himself, hover about and seize the old or the young from the nest amidst the rising multitudes, and with the most daring effrontery. From twenty feet upwards to the tops of the trees the view through the woods presents a perpetual tumult of crowding and fluttering multitudes of pigeons. The noise of their wings is mingled with the frequent crash of falling timber; for the axe-men cut down those trees which seem to be the most crowded with nests, and contrive to fell them in such a manner that in the descent they may bring down several others.* The falling of one large tree sometimes produces 200 squabs little inferior in size to the old ones, and almost one mass of fat.

From the account given of the flight of vast flocks of the passenger-pigeon, it would appear as if they were hardly exceeded in extent or number by those of the locusts in the East. Mr. Wilson mentions some of these flights that he himself saw. On one occasion he was on his way to Frankfort, in Kentucky, where, about one o'clock, he saw a flock of pigeons, more immense in its numbers than any he had ever before witnessed, which flew in a compact body of several strata deep, at a height beyond gun-shot, with great rapidity and steadiness. The breadth of this vast procession extended from right to left so far as the eye could reach, and seemed greatly crowded in all its parts. Curious to determine how long this appearance would continue, Mr. Wilson took out his watch to note the time, and sat down to observe them. He waited more than an hour; but perceiving that this prodigious procession seemed rather to increase than diminish in numbers and rapidity, and being anxious to reach his destination before night, he went on. When he reached Frankfort, about four hours after he first saw the flock, the living torrent over his head seemed as numerous and extensive as ever. On a subsequent occasion Mr. Wilson reverts to this flock, and makes the following curious calculation. If we suppose the column to have been one mile in breadth, (and he believes it to have been much more,) and that it moved at the rate of one mile in a minute; four hours, the time it continued passing, would make the whole length 240 miles. Again, supposing that each square yard of this moving body comprehended three pigeons, the square yards in the whole space multiplied by three, would give 2,230,272,000 pigeons!

In the Atlantic States, though they never appear in such unparalleled multitudes, they are sometimes very numerous, and great havoc is made among them with the gun, the clap net, and various other implements of destruction. As soon as it is ascertained in a town that the pigeons are flying numerously in the neighbourhood, the gunners rise *en masse*; the clap nets are spread out in suitable situations, and some live pigeons being made to flutter on a stick as birds just alighted, numbers of the passing flock are induced to descend and feed on the corn, buck-wheat, &c., which they find strewed about; and, while thus engaged, the pulling of a cord covers them with the net:—sometimes ten, twenty, or thirty dozen are taken at one sweep. Meantime the air is darkened with large bodies of them moving in various directions; the woods also swarm with them in search of acorns; and the thundering of musketry is perpetual on all sides from morning till night. Waggon loads of them are poured into the market, where they sell from fifty to twenty-five, and even twelve cents per dozen; and pigeons are universally found at breakfast, dinner, and supper, until the very name becomes sickening. When they have been kept alive and fed for some time on corn and buck-wheat, their flesh acquires great superiority; but in their common state they are far inferior to the full grown young ones or squabs.

THE CINNAMON-TREE AND ITS PRODUCTS.

The cinnamon-tree (*Laurus Cinnamomum*) is indigenous in the Islands of Ceylon, Sumatra, Borneo, the Sooloo Archipelago, the Nicobar and Phillipine Islands, Cochin China, and the Malabar coast of the Peninsula of India, &c.; and it has been cultivated in the Brazils, Guiana, the Isles of Bourbon and Mauritius, the West India Islands, Egypt, &c.

The tree grows to the height of twenty-five or thirty feet, and the stem to a diameter of from twelve to fifteen inches. The young leaves have a scarlet-crimson colour; the bark of the shoots is often beautifully speckled with dark green and light orange colours. The leaves, when full grown, are from six to nine inches long, and from two to three broad. The flowers appear in January and February, and the seeds ripen in June, July and August. The odour of the flowers resembles the disagreeable smell which emanates from bones when they are sawn. Unless when flowering, the tree emits no odour whatever.

Buffaloes, cows, goats, deer and horses, eat the leaves

and pigeons and crows swallow the berries with great avidity. By these birds the tree is disseminated to a great extent, and in the most impassable jungles; for their stomachs do not destroy the germinating qualities of the seeds.

There is, perhaps, no part of the world in which the cinnamon-tree grows in such abundance as in Ceylon, but even in this island it is chiefly confined to the south-west quarter. In the other parts of the island the tree is comparatively rare, and the bark is deficient in the spicy, aromatic flavour which it possesses in what has been called the "Cinnamon Country." In the north and north-east parts of the island the tree has never been seen. The cinnamon-tree thrives best in a rich, light, dry soil, and some degree of shelter from the ardent rays of the sun seems to be beneficial to it. Cinnamon-trees grow or rather live in nearly quartz sand; but they yield little cinnamon in this soil, as is the case in sandy parts of the Merandalon plantation near Colombo.

There are four plantations of cinnamon in the vicinity of Colombo, consisting altogether of from eight to ten thousand acres, which afford a large portion of the cinnamon that is exported from the island; but a considerable quantity is also procured from the jungles (natural woods), both in the provinces on the coast, and in the interior or Kandyan country. The principal products of the cinnamon-tree are:—

1*st. Cassia buds.* The cassia bud of commerce is the immature fruit and the fleshy receptacle of the seed of the cinnamon tree. The prepared buds have the appearance of nails with roundish heads. Cassia buds possess the same properties as cinnamon, but in an inferior degree. They are chiefly prepared in the Eastern archipelago. The price current of cassia buds in the Canton market is commonly about 6*d.* or 7*d.* a pound, and the import duty for the same quantity is 1*s.* About 1815, the price current of cassia buds in London was from about 5*s.* 6*d.* to 6*s.* 6*d.* per pound. Cassia buds have not hitherto been an article of export from Ceylon, although they might be collected there in great quantities. In 1816, the writer of this paper prepared about 100 pounds weight of cassia buds at Colombo, which were sent to this country, by the late Sir Robert Brownrigg, for the purpose of drawing the attention of government to this article of commerce, which was quite new in as far as Ceylon was concerned, for it does not appear that the Dutch prepared them during their occupation of the island.

2*nd. Cinnamon.* This highly esteemed spice is the prepared bark of the cinnamon-tree. The cinnamon harvest commences in Ceylon early in the month of May, and continues until late in October. Shoots, having a diameter of from half an inch to three inches, yield better cinnamon than larger shoots or branches. The shoots are peeled, by making a longitudinal incision through the bark on both sides, and then introducing a knife under the bark, and thereby separating it from the wood.

The green or outer bark is scraped off from the inner bark, which after being carefully dried becomes the cinnamon of commerce. The Ceylon cinnamon is commonly formed into quills or pipes about forty inches in length. Great care is taken to prevent the cinnamon which is exported from being mixed with inodorous and tasteless bark. There are great differences in the quality of cinnamon, which it is presumed are occasioned by varieties in the climate, soil, or exposure in which the plant grows, the age and health of the tree, and the care and skill employed in its preparation. Cinnamon is exported from Ceylon in bales of 92½ pounds weight, covered with double cloths made of [illegible];—not, as has been stated, of cloth made of the [illegible] of the cocoa-nut-tree. The cocoa-nut-tree has no [illegible]

From the time the English took possession of Ceylon, until about 1823, the East India Company had a monopoly of the cinnamon produced in that island. For the purpose of superintending the sorting and baling of the cinnamon, the Company employed an inspector and two assistants at Colombo, and for a number of years the writer of this article was one of the assistants. The cinnamon was divided by the sorters into three kinds, first and second sorts, and a third or rejected sort. The Company's contract comprehended the first two sorts, and the third or rejected sort remained in possession of the Ceylon government. It was part of the agreement between the contracting parties that the third sort should not be imported into Europe; and while General Maitland was Governor of Ceylon, a great quantity of it was burned with a view of emptying the store-houses. During subsequent periods the third sort found its way, by a circuitous route, to England, where it was imported not under the name cinnamon, but under that of *cassia.* The cinnamon, which is imported from the peninsula of India, Sumatra, Java, &c., as well as the coarse cinnamon which is imported from Ceylon, is denominated casia. Cinnamon, which has been prepared in the Eastern archipelago, is usually made up into quills of about eighteen or twenty inches in length. The import duty from a British possession is 6*d.* per pound; the price of cinnamon in the London market varies from 5*s.* to 10*s.* a pound, according to its quality. The quantities of this spice imported during the year 1832 were, under the head of cinnamon, 225,859 pounds, and under the name of cassia 398,420 pounds. Under the former denomination, 504,643 pounds were exported; and of the latter, 718,772 pounds.

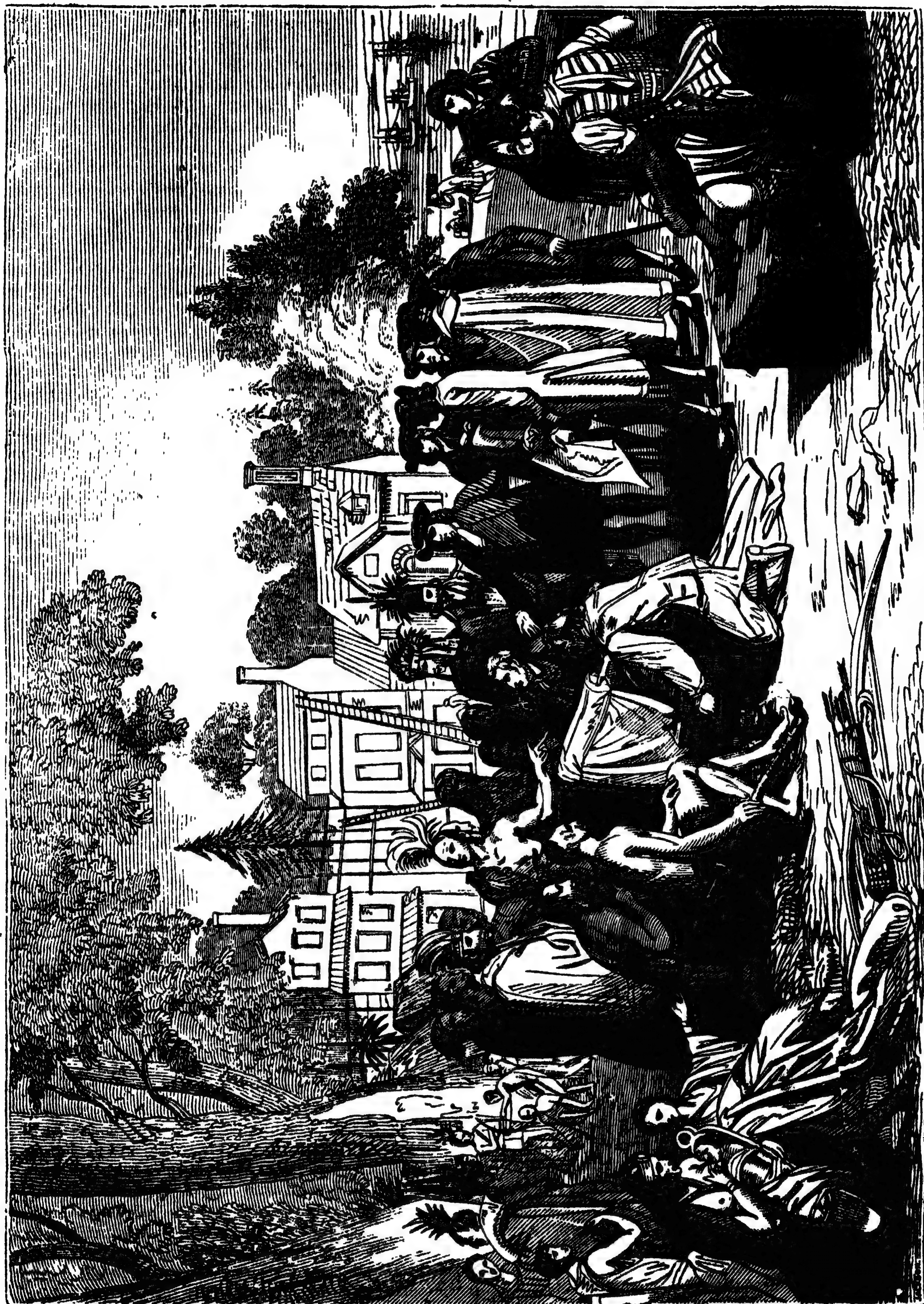
3*rd. The essential Oil of Cinnamon.* This oil is chiefly prepared in Ceylon, and generally from the broken portions which are separated from the quills during the inspection and sorting. The cinnamon chips are grossly powdered, and then they are immersed for about forty-eight hours in sea water. The process of distillation follows, when an oil comes over, which separates into two kinds, a heavier and a lighter; the light oil separates from the water in a few hours, but the heavy oil continues to precipitate for ten or twelve days. Eighty pounds weight of cinnamon yield about two and a half ounces of oil, which floats upon water, and five and a half ounces of heavy oil. Cinnamon oil pays an import duty of 1*s.* per ounce, and that quantity usually sells at about a guinea.

The leaves of the cinnamon-tree yield an essential oil, which exactly resembles the essential oil of cloves; and the bark of the root is strongly impregnated with camphor, from which it may be extracted by sublimation.

All the cinnamon-trees in Ceylon belong to government, and persons who are discovered uprooting trees, for whatever purpose, are liable to the penalty of transportation. By decoction the ripe berries yield a suety matter which is inodorous. This substance is sometimes used by the natives as a liniment for bruises, but they do not, as has been often alleged, make it into candles, for the purpose of diffusing the fine odour of cinnamon, or for illumination. The peeled wood, which is inodorous, is used for fuel only H. M.

WILLIAM PENN'S FIRST TREATY WITH THE INDIANS.

We refer our readers to our 34th Number for a short account of William Penn, the illustrious founder of the colony of Pennsylvania. The wood-cut which we now publish represents one of the most remarkable and interesting events in his life, and in the history of the world. It is a copy from the late Benjamin West's picture of the meeting of Penn and the Indian chiefs, for the ratification of the sale of the territory of Pennsylvania by the latter to the former, and the conclusion of a treaty of peace and amity between the two parties.



[Penn's Treaty with the Indians, from the Picture by West.]

Penn had received the property of the vast tract of land constituting the present State of Pennsylvania by patent from Charles II., in March, 1681; but he did not deem the royal grant to be his sufficient authority for taking possession of the country until he had obtained the consent of those by whom it was actually inhabited. Accordingly, very soon after his patent had been signed, he deputed commissioners to proceed to America, and to enter into a negociation with the Indians for the fair purchase of so much of the territory as they claimed a right to. The desired arrangement was made with little difficulty; and the following year, Penn having himself come over to view his acquisition, it was resolved that the compact which had been made should be solemnly confirmed.

The principles and regulations which Penn had laid down from the first for the treatment of the native inhabitants, and the management of the intercourse between them and the European colonists, were characterised by a spirit of liberality exceedingly remarkable

for that age. It was made part of the conditions on which grants of land were made to adventurers that all mercantile transactions with the Indians should take place in the public market; that any wrong done to an Indian should be punished in the same manner as if a white man had been the person injured; and that all differences between planters and Indians should be settled by the verdict of twelve men, six of the one class and six of the other. And in a letter addressed to the Indians themselves, after mentioning the existence of a Great God, or Power, the Creator of the World, who hath commanded us all to love, to help, and to do good to one another, he continued;—"I would have you well observe that I am very sensible of the unkindness and injustice which have been too much exercised towards you by the people of these parts of the world, who have sought themselves to make great advantages by you, rather than to be examples of goodness and patience unto you. This, I hear, hath been a matter of trouble to you, and caused great grudging and animosities, sometimes to the shedding of blood, which hath made the Great God angry. But I am not such a man, as is well known in my own country. I have great love and regard towards you, and desire to win and gain your love and friendship by a kind, just, and peaceable life; and the people I send are of the same mind, and shall in all things behave themselves accordingly; and if, in anything, any shall offend you or your people, you shall have a full and speedy satisfaction for the same, by an equal number of just men on both sides, that by no means you may have just occasion of being offended against them." By the Europeans who first landed on the new continent, and by almost all who had followed them till then the unhappy natives had been treated as if they had possessed no more rights of any kind than the lower animals that occupied the wilderness along with them. Penn was the first who really recognized them as belonging to the family of man.

From the commencement of his connexion with them, Penn appears to have applied himself to the study of the character and manners of the Indian tribes. In a 'General Description of the Province of Pennsylvania,' which he published in 1683, (to be found in his collected works, 2 vols. fol. 1726, vol. ii. p. 699,) he tells us that he had even made it his business to understand their language, that he might not want an interpreter on any occasion. The following is a part of the account which he gives of their dispositions and habits in the same publication:—

"But in liberality they excel,—nothing is too good for their friend; give them a fine gun, coat, or other thing, it may pass twenty hands before it sticks;—light of heart, strong affections, but soon spent; the most merry creatures that live, feast and dance perpetually; they never have much, nor want much; wealth circulateth like the blood, all parts partake; and though none shall want what another hath, yet exact observers of property. Some kings have sold, others presented me with several parcels of land; the pay or presents I made them were not hoarded by the particular owners, but the neighbouring kings and their clans being present when the goods were brought out, the parties chiefly concerned consulted what and to whom they should give them. To every king there, by the hands of a person for that work appointed, is a proportion sent, so sorted and folded, and with that gravity, that it is admirable. Then that king sub-divideth it in like manner among his dependents, they hardly leaving themselves an equal share with one of their subjects: and be it on such occasions as festivals, or at their common meals, the kings distribute, and to themselves last. They care for little because they want but little, and the reason is a little contents them: in this they are sufficiently revenged on us; if they are ignorant of our pleasures, they are also free from our pains. They are not disquieted with bills of lading and exchange, nor perplexed with chancery suits and exchequer reckonings. We sweat and toil to live; their pleasure feeds them; I mean, their hunting, fishing, and fowling, and this table is spread every where. They eat twice a-day, morning and evening; their seats and table are the ground. Since the Europeans came into these parts, they are grown great lovers of strong liquors, rum especially; and for it exchange the richest of their skins and furs. If they are heated with liquors, they are restless till they have enough to sleep; that is their cry, 'Some more, and I will go to sleep!' but, when drunk, one of the most wretchedest spectacles in the world. . . These poor people are under a dark night in things relating to religion, to be sure, (the tradition of it,) yet they believe a God and immortality without the help of metaphysics, for they say, There is a Great King that made them, who dwells in a glorious country to the southward of them; and that the souls of the good shall go thither, where they shall live again."

It had been agreed that the meeting for the ratification of the compact should take place at Coaquannoc, the name given by the Indians to the spot on which Philadelphia now stands. The parties, however, after assembling, proceeded a little higher up the Delaware, to a place then called Shackamaxon, on which the adjoining village of Kensington has been since built, and where there grew an immense elm, under the spreading branches of which the leaders on both sides took their station. Mr. Clarkson, in his 'Life of Penn,' (2 vols. 8vo., Lon. 1813,) expresses his regret that in no historian has he been able to find any detailed account of the circumstances of this meeting, though the event itself is so famous. He gives, however, some interesting particulars, principally derived from the traditions preserved in Quaker families, descended from those who were present on the occasion. "William Penn," he says, "appeared in his usual clothes. He had no crown, sceptre, mace, sword, halbert, or any insignia of eminence. He was distinguished only by wearing a sky-blue sash round his waist, which was made of silk net-work, and which was of no larger apparent dimensions than an officer's military sash, and much like it except in colour. On his right hand was Colonel Markham, his relation and secretary, and on his left his friend Pearson; after whom followed a train of Quakers. Before him were carried various articles of merchandize, which, when they came near the Sachems, (or kings,) were spread upon the ground. He held a roll of parchment, containing the confirmation of the treaty of purchase and amity, in his hand. One of the Sachems, who was the chief of them, then put upon his own head a kind of chaplet, in which appeared a small horn. This, as among the primitive eastern nations, and according to Scripture language, was an emblem of kingly power; and whenever the chief, who had a right to wear it, put it on, it was understood that the place was made sacred, and the persons of all present inviolable. Upon putting on this horn, the Indians threw down their bows and arrows, and seated themselves round their chiefs, in the form of a half-moon upon the ground. The chief Sachem then announced to William Penn, by means of an interpreter, that the nations were ready to hear him."

Penn's speech appears to have embraced nearly the same topics as his letter already quoted. After its delivery he unrolled the parchment, and by means of the interpreter, explained it article by article. The compact was based upon the principle that the land was to be common to the Indians and to the English; and that the natives were to have the same liberty to do what was necessary for the improvement of their grounds, and the

providing of sustenance for their families which the settlers had. "He then," continues Mr. Clarkson, "paid them for the land, and made them many presents besides, from the merchandize which had been spread before them. Having done this, he laid the roll of parchment on the ground, observing again, that the ground should be common to both people. He then added, that he would not do as the Marylanders did, that is, call them children or brothers only; for often parents were apt to whip their children too severely, and brothers sometimes would differ: neither would he compare the friendship between him and them to a chain, for the rain might sometimes rust it, or a tree might fall and break it; but he should consider them as the same flesh and blood with the Christians, and the same as if one man's body were to be divided into two parts. He then took up the parchment, and presented it to the Sachem, who wore the horn in the chaplet, and desired him and the other Sachems to preserve it carefully for three generations, that their children might know what had passed between them, just as if he had remained himself with them to repeat it." The solemn pledges of the Indians to perform faithfully their part in the contract followed this harangue.

Penn does not mention this treaty in particular in his 'Description of Pennsylvania,' to which we have already referred; but he gives the following general account of the manner in which his Indian friends were wont to conduct themselves on such occasions. "Every king hath his council, and then 'tis admirable to consider how powerful the kings are, and yet how they move by the breath of their people. I have had occasion to be in council with them upon treaties for land, and to adjust the terms of trade; their order is thus:—the king sits in the middle of a half-moon, and half his council, the old and wise, on each hand; behind them, or at a little distance, sit the younger fry, in the same figure. Having consulted and resolved their business, the king ordered one of them to speak to me; he stood up, came to me, and in the name of his king saluted me, then took me by the hand and told me he was ordered by his king to speak to me, and that now it was not he, but the king that spoke, because what he should say was the king's mind. He first prayed me to excuse them that they had not complied with me the last time; he feared there might be some fault in the interpreter, being neither Indian nor English; besides, it was the Indian custom to deliberate, and take up much time in council, before they resolve; and that if the young people and owners of the land had been as ready as he, I had not met with so much delay. Having thus introduced his matter, he fell to the bounds of the land they had agreed to dispose of, and the price, (which now is little and dear, that which would have bought twenty miles, not buying now two.) During the time that this person spoke, not a man of them was observed to whisper or smile; the old were grave, the young, reverent in their deportment; they do speak little, but fervently and with elegancy: I have never seen more natural sagacity, considering them without the help, I was going to say the spoil, of tradition; and he will deserve the name of wise that outwits them in any treaty about a thing they understand. When the purchase was agreed, great promises past between us of kindness and good neighbourhood, and that the Indians and English must live in love, as long as the sun gave light. Which done, another made a speech to the Indians, in the name of all the *sachamakers* or kings, first, to tell them what was done; next, to charge and command them to love the Christians, and particularly live in peace with me, and the people under my government; that many governors had been in the river, but that no governor had come himself to live [illegible] here before; and having now such an one that [illegible] treated them well, they should never do him or his any wrong. At every sentence of which they shouted, and said amen in their way."

Everything connected with this treaty,—the only one, as Voltaire has remarked, ever made between the native inhabitants of America and the Christians that was not ratified by an oath, and that was never broken,—was long held in reverential remembrance by both the English and the Indians. The parchment roll was carefully preserved by the latter, and was exhibited by them in various conferences which they had with the English authorities, down nearly to the æra of the independence of the colonies. The sash which Penn wore, Mr. Clarkson states, was, when he wrote, in the possession of Thomas Kett, Esq., of Seething Hall, near Norwich. The elm, especially, which had shaded the assembled negociators, became celebrated from that day. With such general veneration and affection was it regarded, that even the British General Simcoe, when he was quartered in the neighbourhood during the revolutionary war, placed a sentinel under it to protect it from being injured by his men when they went out to collect firewood. It was at last, however, blown down in 1811, when its trunk and branches were cut into various articles, to be preserved as memorials of the honoured tree.

Penn, as he intimates in the passage we have just quoted, concluded several other treaties or bargains with the Indians after this, which may be called the fundamental compact between the two parties. All these negociations appear to have been conducted in a spirit of amity and mutual accommodation, which no attempt to obtain undue advantages, or any suspicion of such an attempt, on either side, ever disturbed. The state which Penn founded, although consisting of comparatively a mere handful of people, subsisted for several generations, as has been remarked, "in the midst of six Indian nations without so much as a militia for its defence. Mr. Clarkson affirms, "that as far as the Indians and Quakers (who may be considered as the descendants of William Penn) were concerned, the Great Treaty *was never violated*, a good understanding subsisting at this moment between them and the descendants of the original tribes."

THE DEAF TRAVELLER.—No. 5.

VEHICLES OF PERSIA AND TURKEY.

HAVING brought the reader one stage of my journey somewhat in detail, I must now a little alter my mode of proceeding, as it would not suit well with the objects of the 'Penny Magazine' to go on with such minute descriptions as might be expected in a volume of travels. It is thus that I do not set forth my notes as travels within a specified range; but as the collective remarks and observations of a 'Deaf Traveller,' on such of the subjects which came under his notice as he judges to be interesting to the general reader.

In the journey to Bagdad we had travelled in English landaus from Petersburgh to Teflis, where, leaving them to be sold, we proceeded to Shausha, in the Karabaugh, in waggons, without springs, belonging to the German colonists in Georgia: the roads then becoming impracticable to wheel-carriages, we were obliged to perform the rest of the journey on horseback in Persian saddles. Having never mounted a horse but twice before in my life, I had looked forward to this part of the journey with considerable apprehension; but though I had my share of the usual trials and difficulties of an inexperienced horseman, I got through without serious injury. It has been already stated that the early part of the present journey was performed on pack-horses so far as Tehraun. We were there induced to ride saddle-horses. I thus rode to the shores of the Black Sea, with the exception of the stages between Erzeroom and Gumush Khona, which were performed in kind of

cages covered with felt, and thrown, after the manner of panniers, over the backs of horses. At Gumush Khona, the danger of having our vehicles dashed to pieces against the rocks obliged us to recur to the saddle. This various experience qualifies me to make a few remarks on the different modes of travelling in the East.

I saw no wheel-carriages of any kind in Persia; but in Armenia, a few stages before Erzeroom, my eyes were gladdened by the sight of wheel-ruts in the snow. I could hardly believe this phenomenon to be caused by wheels, till I soon after overtook a rude cart drawn by two oxen, and laden with straw. In its tray-like form this vehicle is not unlike the carts or horse-chairs I had seen in Zealand, but not raised so high above the ground, and of infinitely ruder materials and workmanship. These *arabas*, however, are in both respects much superior to the vehicle of the same name and form used in Asiatic Russia by the Kalmuks, in which not the least iron is used, and the peculiar and horrid creaking of whose wheels has obtained the appropriate designation of Tatar music*. At Constantinople the araba assumes a more splendid, if not a more dignified, appearance, being there used for much the same purposes as a hackney-coach among ourselves, and has the appearance of a long, covered cart, or light waggon, gloriously gilt, and painted with white, red, and green. They are usually drawn by bullocks, gaily caparisoned; and are almost exclusively appropriated to the use of sick persons, women and children, being considered too effeminate for the use of a man in health. Except in the neighbourhood of Teflis, in Georgia, no other instance than this at Constantinople was ever in the East brought under my notice, of wheel carriages applied to the purpose of personal conveyance. These *arabas*, however, can hardly be regarded as *travelling* vehicles, in the proper sense of the term,—a short excursion into the country is the extreme limit of their service.

In Persia, where there are no arabas even for such uses, the most dignified vehicle for travelling is the *takht ravan*. This is a large box with an arched roof, and a door-way at one end, covered usually with green cloth or even velvet, and often ornamented with embroidery and lace. It is commonly five feet in length, nearly four in height, and about two and a half in breadth, allowing the person within the option of either extending himself at length, or of sitting upright, cross-legged, or on his heels,—the latter convenience is that of which the natives are in general the most studious. On each side there are staples, and by poles which are inserted into them, the vehicle is carried between two camels, mules, or horses. This mode of conveyance is used chiefly by ladies of distinction; yet it does not appear to be considered unmanly, as I remember that, on leaving Tabreiz for Bagdad, we saw approaching the city we left, one of these *takht ravans* attended by soldiers and cavaliers well mounted and attired. And, on inquiry, we were told that the vehicle contained Abbas Meerza, on his return from the campaign in Kourdistan. Compared with a coach, this is doubtless a very awkward and undignified mode of conveyance. I suppose, however, that it is superior in point of dignity and convenience to any possessed in our own country till the latter end of Elizabeth's reign,—till after the time when that dignified queen was wont to ride, on state occasions, behind the lord steward on a pillion.

The only vehicle which it remains to specify, is that in which, as before mentioned, I travelled from Erzeroom to Gumush Khona. This differs only in size and mode of use from the takht ravan, unless that the *muhaffy* may be somewhat higher in proportion to its size than the takht ravan,—the object of lying out at length being relinquished, whilst that of sitting upright is retained. It is about three feet long, nearly four high, and about two in width. In winter this is warmly covered within and without by thick felt, with a hanging door of the same, so that altogether the *muhaffy* is a snug little box to travel in. But it has this inconvenience, that however comfortable it may be to an Oriental to sit cross-legged or on his heels all day, it requires much practice to render such a position tolerable to an European, though in this vehicle he is obliged to maintain it. I mentioned that two of these cages are thrown over the back of the horse in the manner of panniers,—so that two persons are carried, one in each cage. As the people are not at all careful in the adjustment of the balance, the travellers, unless they are of nearly equal weight, are much annoyed by the unequal ponderance of the one or the other, involving as it does the danger of complete overthrow. My invalid companion, on account of whose indisposition we thus travelled, though by no means the bulkiest of men, so far outweighed me, that even the attendants perceived that something must be done to make the balance true. They were, therefore, in the habit of garnishing my cage with the hair-bags in which they gave corn and chopped straw to their cattle.

* I remember, when at a Kalmuk camp on the River Kuma, a Tatar attended me in the examination of one of these arabas. I endeavoured to express to him my surprise that no iron was used, and that the wheels were unplated. Pointing very significantly to my pencil-case, to himself, and to the cart-wheel in succession, I understood him to intimate that if I would furnish him with *silver* he would furnish his cart with *iron*.

RICHARD CŒUR DE LION.

Most of our readers probably remember the romantic story that is told of the manner in which King Richard I. was discovered by his minstrel, Blondel de Nesle, in a castle in the heart of Germany, into which he had been thrown by his enemy Duke Leopold of Austria, on his way home from the Holy Land. It is said that, as he pursued his search after his lost master, Blondel was in the habit of inquiring, whenever he came to a castle or fortress, if there was any prisoner of distinction confined in it. Having arrived in the neighbourhood of that in which Richard was immured, he was informed, in reply to his customary question, that within one of its towers it was believed that a great king was shut up. He felt strongly persuaded that it could be no other than Richard; but to assure himself, he took his station near the tower and began to sing a lay, which the King and he had composed together, or at least had often sung in concert, and the notes of which he knew could not fall on the royal ear without awakening the conviction that a friend was nigh. Accordingly, he had not finished the first stanza before the voice of Richard had joined his own. Blondel immediately hastened home to England with the news of the discovery he had made, and which was received with great rejoicings by the people. It was the information thus obtained which, according to the story, led to the negociations for Richard's ransom, and soon after to his liberation.

We fear, however, all this must be considered as belonging to the romantic, not to the real history of

> "Richard, that robbed the lion of his heart,
> And fought the holy wars in Palestine."

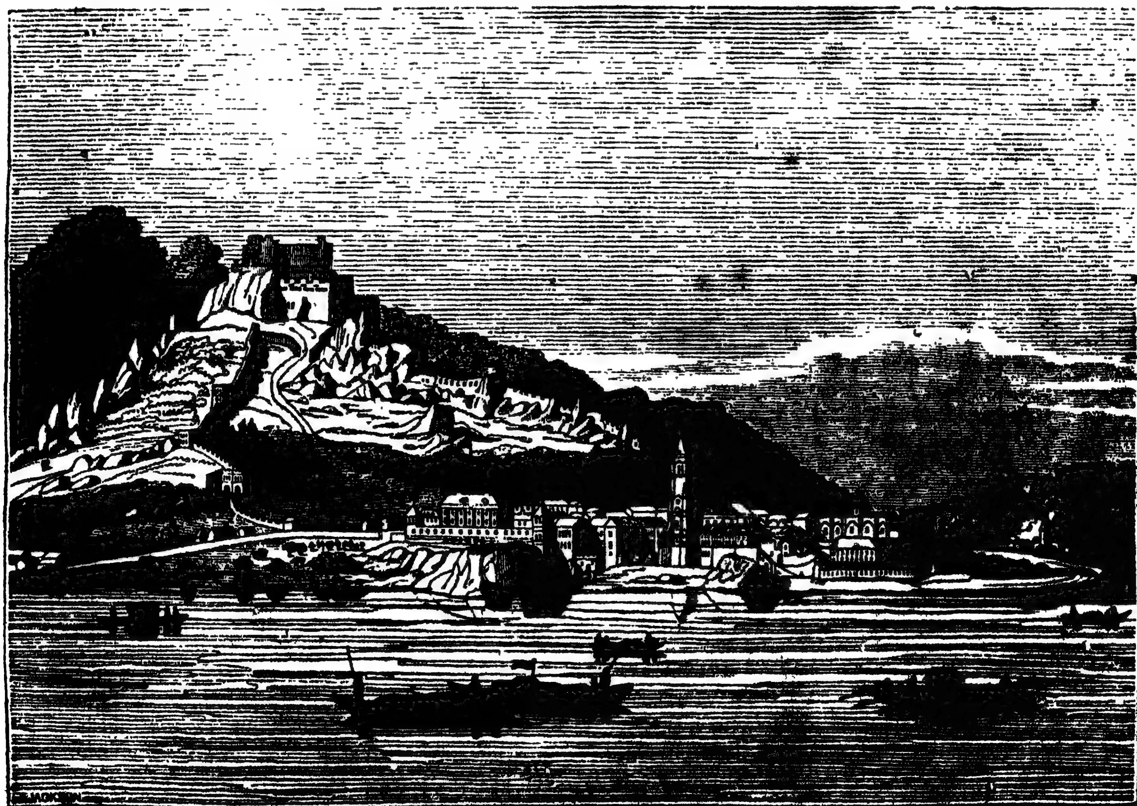
Blondel's ingenious and successful stratagem is not mentioned by any of the old English historians who relate the particulars of the King's captivity and deliverance; nor, indeed, does it appear that any attempt was made, by those into whose hands he had fallen, to conceal what they had done with him. The incident is quite in the spirit of romantic fiction, and has probably no better foundation than many of the other adventures ascribed to Richard Cœur de Lion in the famous metrical legend which bears his name, and professes to be a narrative of his life and exploits. We may remark, by the by, that the title by which this king is distinguished,

Richard of the Lion's Heart, had, according to this old romance, a somewhat different origin from that commonly assigned to it, having been given to him, not simply as descriptive of his remarkable valour and prowess, but in memory of a contest in which he once engaged with a lion, and which he terminated by thrusting his hand down the beast's throat and pulling up its heart. It was during his imprisonment in Germany that he performed this extraordinary feat, which it may be observed is alluded to by Shakspeare, both in the line quoted above from the play of King John, and in another passage of the same play, where it is said that against his

> "fury and unmatched force
> The aweless lion could not wage the fight,
> Nor keep his princely heart from Richard's hand."

That Richard, however, was both a lover of poetry and a practitioner of the art himself, are facts that rest upon tolerably good evidence. He had, early in life, acquired a taste for the Provençal minstrelsy, by his residence in France for many years as Duke of Poitiers; and when he came to the throne, he invited to the English court several of the most eminent poets who then flourished in that country. From this circumstance we are to date the origin of the composition of metrical romances in England. Very few of the King's own compositions, however, have come down to us. Ste. Palaye, in his 'Literary History of the Troubadours,' gives translations of two *sirventes*, or songs of Richard's, which exist both in Provençal and in Norman French, there being some doubt in which language they were originally written. As M. Ste Palaye remarks, these productions are inspired rather by anger than love, although they each conclude with the usual *envoy* to the poet's mistress. The first is said to have been composed by the royal minstrel during his confinement in Germany, and is a bitter reproach addressed to his English and Norman Barons for not exerting themselves to procure his liberation. It consists of five stanzas, and is expressed with a brevity and simplicity which produce a favourable impression of its author's taste and skill. A very diffuse and feeble translation of it, in Engish verse, may be found in Dr. Burney's 'History of Music;' another and much more poetical version of it has since been published from the pen of Mr. George Ellis, in Mr. Park's edition of Walpole's 'Royal and Noble Authors.' The other piece is also animated by the same indignant spirit, being a reproach addressed by Richard, after his recovery of his liberty, to his former friends the Dauphin of Auvergne and Count Guy, for declining to join him in the war in which he had engaged with Philip Augustus the French King. Auvergne, who was also a poet, replied to his strain, in an effusion which has also been preserved. Another piece in mixed romance and Provençal has also been published, which is said to be the very song by means of which Blondel discovered his royal master; and a song by Richard, which had not before been known to exist, was printed at Toulouse, in 1819, in a work entitled 'Parnasse Occitanien.' See also the fourth volume of Raynouard's *Choix des Poësies Originales des Troubadours.*

The castle in which Richard was confined is said to have been that of Diernstain or Durnstein, in Lower Austria. The annexed wood-cut presents a view of its remains, taken from an engraving by Jos. Const. Stadler, published in 1798, when the castle is stated to have belonged to the Prince of Stahrenberg. It stands on the north or left bank of the Danube, about fifty miles above Vienna, and, as may be seen on the print, on the top of a hill or rock, close to the river. The village of the same name, at the foot of the hill, contains, or formerly contained, a convent of regular canons of St. Augustine. Richard is said to have been confined here for about fifteen months. He sailed from Palestine on the 9th of October, 1192, and landed at Sandwich on his return to his own dominions on the 20th of March, 1194.



[Castle and Village of Durnstein, from the Danube.]

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ORGANIC REMAINS RESTORED.



[Organic Remains Restored.]

Before we entirely leave the subject of Organic Remains, in order to give the reader a clearer idea of the animals and vegetables which characterise the lias and oolitic series of the secondary strata (see diagram No. 1, G to M, page 21), we give a representation of the principal species at present known as restored by some of the most eminent geologists. The following is a list of the different objects as indicated by the figures in the wood-cut:—

I.—Plants.

1. 1. Ferns. (*Filices.*)	4. Dracæna.
2. Zamia. (*Cycadæ.*)	5. Araucaria Pine.
3. Arbor Vitæ.	6. 6. Mare's Tail. (*Equisetum.*)

II.—Animals.

7. Dragon Fly.	13. Echinus.
8. Geometric Tortoise.	14. Nautilus.
9. Megalosaurus.	15. Cuttle Fish.
10. Icthyosaurus.	16. Encrinitis.
11. Plesiosaurus.	17. Bird-like bats. (*Ornithocephali.*)
12. Ammonitis.	

MINERAL KINGDOM.—Section 15.

Coal.

Among the many mineral treasures which the soil of the United Kingdom contains, coal is unquestionably the most valuable. It is the chief source of our wealth and power as the foundation of our manufacturing industry; and without such an abundant supply of fuel, our iron, lead, tin, and copper ores must have remained in their native beds. It claims, therefore, the first place in the accounts we propose to lay before our readers of the mineral substances which enter into the business of common life; and we shall now proceed to describe its composition, the manner in which it exists in the bowels of the earth, its probable origin, the different situations in which it is found, and the methods employed to obtain it.

Composition.—Coal is a compound substance, consisting of charcoal, bitumen, or mineral pitch, and earthy matter. Its various qualities depend on the manner in which these ingredients are combined, a large quantity of bitumen producing the fat caking qualities common in the Newcastle mines; and, when it is in small proportion, that dull variety which burns almost without flame;—if there be much earth, the quantity of ashes is proportionably increased. The specific gravity of coal compared with that of water is, on an average, as 1,250 to 1,000,—that is, if a given bulk of water weighs 1,000 grains, a piece of coal of precisely the same bulk would weigh 1,250. When we say that coal is a combination of charcoal and bitumen, we employ rather the terms of a popular explanation of its composition than the strict language of chemical analysis; for that resolves it into a greater number of elementary substances, all of which are gases, with the exception of the carbon. Carbon, the chemical name for charcoal in a state of purity, constitutes the chief ingredient of all coals, amounting to from sixty to seventy per cent.; it is a simple elementary body: but bitumen, the other chief ingredient, is a compound substance, for it yields a large quantity of hydrogen gas, or inflammable air; and oxygen gas, that which constitutes the pure part of the air of the atmosphere and sustains life, has also been found in considerable quantity in coal. When coal is strongly heated in a close iron vessel, the hydrogen gas is given out in combination with carbon, forming the gas used for lighting; and those coals which contain the most bitumen yield the largest quantity of gas. The flame of coal, in a common fire, is occasioned by a sort of distillation of the coal which is slowly going on; gas is given out in the process, and is set fire to. We often see the Newcastle coal, in our grates, swelling up like a soap-bubble, which is occasioned by the disengagement of gas in the midst of the softened bituminous coal; and when we hear a rushing sound issuing from the coals accompanied with smoke, if we bring a bit of lighted paper to the smoke, it catches fire on account of the large admixture of gas. The gas from coal may be exhibited in a very simple way, by putting some pounded coal into the bowl of a tobacco-pipe, closing it up well with clay, and placing it in a strong common fire; smoke will soon issue from the pipe, and, if a lighted candle be applied, it will catch fire and continue to flame for some time: what remains in the bowl is coke or charcoal.

The coals used in this country for fuel may be divided into three different kinds: 1. The stone-coal, or splent-coal, as it is sometimes called from its splintery fracture, has the least proportion of bitumen, and, by being intermixed with much earthy matter, yields a large quantity of ashes. There is no precise name for this kind of coal, neither among miners nor geologists, and there is consequently much confusion in descriptions of different coal-mines; what we speak of now is the prevailing quality in the Staffordshire and Scotch coal-fields;—2, the caking-coal, which is the prevalent quality in the Northumberland and Durham mines,—that used in London;—and, 3, a variety called cannel-coal in England and parrot-coal in Scotland, which has a very close compact texture, is hard and splintery, crackles in the fire, and burns with a very bright flame: it is found, however, in comparatively small quantities. These different kinds are sometimes all met with in the same mine; and there are many varieties in different places partaking more or less of the character of one of the three.

Geological Situation.—All the above-mentioned qualities of coals are found under the surface of the ground, associated with beds of sandstone of different textures, of a hard slaty clay called shale, presenting also great differences of composition, colour, and hardness, and occasionally with beds of limestone. These associated beds, or strata, of coal, sandstones, clays, shales and limestones, are usually called the coal measures by practical miners, and a tract of country containing the mines, a coal-field; both terms are very convenient, and have been adopted by the geologists of this country. There is no determinate order in which these strata occur in different coal-fields, but in different parts of the same coal-field they generally preserve a regular succession. Coal-fields are usually separated from each other by extensive tracts of country, composed of rocks in which no coal exists, and they vary in magnitude from a few acres to many square miles. The measures in the same field sometimes consist of a hundred alternations of beds, all of very different degrees of thickness, from less than an inch to many feet; and this difference applies equally to the beds or seams of coal as to the rest, but the proportion of coal to the interstratified stones is always much inferior.

The rocks which are comprehended in what, as a whole, may be called the coal formation, are, beginning with the lowest:—

1. The old red sandstone. (P*.) When this is present it forms the foundation of the whole, and when not present, the coal-measures rest, of course, on the older strata which lie beneath that sandstone.
2. A limestone, called by English geologists the mountain limestone, and also, which is much better, the carboniferous limestone,—that is, the *coal-bearing*. (O.)
3. Beds of coarse sandstone, composed of sand and flinty pebbles, sometimes fine-grained, but more generally very coarse, called the millstone grit,

* The letters refer to the diagram in No. 51, 19th of January, 1833.

(N.,) grit being a provincial name for sandstone, and millstones being got from some parts of it.

4. The coal measures. (M.)

In the north-eastern, midland, and southern coal-fields of England this is the usual order, the coal being all above the millstone grit; but in the north-west of England the beds of coal are interstratified both with the millstone grit and with the carboniferous limestone.

Thin seams of coal, and even sometimes so thick as to be worth working, are occasionally found in some of the superior deposits of the secondary strata; but all the great coal-measures belong to the lowest part of the secondary series. (See Diagram in No. 51.) Coal, such as we are now describing, has never been found in or below the old red sandstone, P, and never in or above the magnesian limestone, L, or rather a red sandstone which lies immediately beneath that limestone. No searches for coal, therefore, in the great series of strata which lie above the coal-measures. (see Diagram in No. 51,) or in the old red sandstone and the strata beneath, can ever turn to good account, and in ninety-nine cases out of a hundred would be fruitless. Vast sums of money have been again and again thrown away in such attempts; and it is much to be regretted that many of those persons who, in this country, follow the profession of what is called a mineral surveyor are extremely deficient in the scientific knowledge requisite for the right understanding of their business. Men of property too often suffer themselves to be led into mining undertakings of vast expense by ignorant pretenders; and are often subjected in consequence to enormous losses which an application to a scientific geologist might have saved them from. In France and Germany this can rarely or ever happen, because the mining engineers of those countries are regularly trained to their business by a preliminary scientific education. Nothing can be more absurd than that, in a country so abounding in mineral treasures, and depending so much as Great Britain does for her national prosperity upon her mines, there should not exist a single institution, either in our universities or elsewhere, in which a young man desirous of educating himself thoroughly as an engineer of mines can obtain the necessary instruction. It would be an immense advantage to individual proprietors of mines, and would be an equally great national benefit, if a school of mines were established, where the different branches of science connected with the whole subject should be taught, with the means, at the same time, of giving that practical knowledge without which the most complete scientific education would be of little avail. But to make such a school really useful, it would be necessary that it should be a chartered establishment, possessing the power of conferring a professional title upon its pupils, after strict examination and ample proofs of competency. Bristol would be, perhaps, upon the whole, the best place for such a school, because it is itself in a mining country, is in the immediate neighbourhood of the great coal and iron districts of the south of Wales, and not very far from Cornwall; and its neighbourhood is admirably suited for elementary field-instruction in geology.

[We shall continue the subject of the geological situation of coal in our next Section.]

THE VINTAGE.

(*Abridged from Redding's 'History and Description of Modern Wines.'*)

The vintage is the next important operation connected with the vine after the cares of the dresser are over. Not only do the opinions of individuals in wine countries differ very widely upon the management of the vintage, but in some the period of the gathering is regulated by authority, as if the vine-grower was not the best judge of the state of his produce, and did not know when his property was in the best order for yielding him a profitable return. The signs which usually regulate it are observed in the south of Europe about the end of September, or commencement of October. In the north, the fear of autumnal frosts, which injure the unripe grape, makes the seizure of the exact moment proper for the vintage a matter of great importance.

The time of the vintage being fixed, it is begun as early in the day as possible after the sun has dissipated the dew. The red grape is generally ripe before the white. In the north, they are not so particular respecting the dryness of the fruit when gathered as in the south; in fact, it is often gathered, in the north of France, with the dew upon it. The gathering is uniformly continued with as much rapidity as possible, if the weather continue fair, so as to terminate the pressing in one day. If this cannot be done, the vintage is suspended, for the fermentation in a warm, or even a moderate temperature, is far more energetic than in cold, damp weather. It ruins the durability of the wine if the fruit is gathered and fermented at such a time.

The fruit in some countries is cut off the plant with a knife; in France, the scissors is used, by which the stems of the branches are rapidly severed. In ruder countries, the hand only is applied, a mode injurious to the grape as well as to the vine. The most approved plan is to make three separate gatherings of the fruit. The *first* includes all the finest and ripest bunches. The green, rotten grapes, or such as have been eaten into by insects, are cleared from the bunches, which are then carefully carried home. The *second* gathering implies naturally a second pressing. The grapes are not quite as ripe as the first. The *last* gathering and pressing consists of the inferior grapes. The gathered bunches are deposited as lightly as possible to prevent the grapes from being bruised. All dry or spoiled grapes are cast aside, where proper care is used, as fine or delicate wine is intended to be made. Each labourer places his gathering in an ozier basket, or in a sort of wooden dosser, carried with the least possible motion. In France, in the department of the Marne, the grapes are carried on horseback covered with cloths. The grapes in some countries are plucked from the bunches; in others, they are placed entire in the press, stems and all. The best grapes only are used for making the better kinds of wine. The astringent principle lodged in the stems is thought to be beneficial, and to impart to the wine a capacity of endurance or long keeping. When picked, it is only for red wine, and is generally done by the hand. White-wine grapes are rarely picked from the clusters.

Grapes were anciently trodden out, after being exposed, on a level floor, to the action of the solar rays for ten days. they were then placed in the shade for five days more, in order to mature the saccharine matter. This practice is still followed in some of the islands of the Greek Archipelago, at St. Lucar in Spain, in Italy, at least in Calabria, and in some of the north-eastern departments of France. The fermentation is facilitated greatly by this process. In some parts of France, a labourer with sabots treads the grapes out as they come from the vineyard in a square box, having holes in the bottom, and placed over a vat,—a very barbarous method. The murk is then removed, and he proceeds with fresh grapes till the vat is full. Sometimes they are squeezed out in troughs, by naked men, using both sabots and hands at once.

The wine-press differs in construction in different countries. There are several kinds. For red wine, the grapes are trodden before they are pressed, in order to disengage the colouring matter from the skins; but in making white wine, this operation is never performed. In either case, where the press is applied, the first pressing is dispatched as quickly as possible.

At first the press is used gently, that the wine may not overflow. The pressure is then gradually increased, until the murk becomes moderately compressed. This is the first pressing. The grapes that did not sustain pressure, being scattered over the edges of the heap, are now gathered up, the press relaxed, and being placed upon the murk, the press is tightened again. The wine from this is called of the second pressing. The edges of the whole mass are now squared down with a cutting instrument, so that the mass of fruit is reduced to the form of an immense oblong cake, upon which the cuttings of the edges are heaped, and the press worked again, which makes wine of the third pressing. or, as the wine-maker calls it, *wine of the first cutting*. The pressing and cutting are repeated two or three times. and what liquid flows after is called among the labourers wine of the second or third cuttings.

The great wine-press is capable of making no less than twenty-five pieces of wine in four hours. Where vineyards are extensive, as it is desirable to press the produce of the gathering in one day, however large in quantity, this press is useful; but it is the instrument of making a large quantity of secondary wine, rather than a little of a choice character, and is used principally by the larger vine-growers. There is only one species of wine which is made without beating, treading, or pressing, this is what they call in Spain *lagrima*. The grapes, melting with ripeness, are suspended in bunches, and the wine is the produce of the droppings. This can only be effected with the *muscatel* grape of the warm south. In this way the richest Malaga is made. In Cyprus the grapes are beaten with mallets, on an inclined plane, with a reservoir at the end.

Mr. Redding enters into some statements concerning various uses of the vine which are not in England commonly known, and which we are obliged by our limits greatly to condense. The must of the south is employed in making a rich confection with citrons and aromatic sweets. On the residue of the grapes, the refuse of the vintage, together with the murk, hot water and syrup are thrown, and the product is a very small wine, cooling and pleasant to the taste. One hundred and ninety-five pints of murk, burned, furnish five and a quarter of potash. The murk, beaten in water and distilled, produces brandy of a secondary quality. Vinegar is also extracted from the murk, which is first acidified. Verdigris is made from the murk by placing plates of copper and murk alternately in a vessel to which the plates fit in diameter. The whole is wetted from time to time with acid wine. When the oxidation is complete, the verdigris is taken out and put into packages for sale. The murk is eagerly sought after by all the herbivorous animals for nourishment. It is either given dry or mingled with other fodder. Fowls are remarkably fond of it. The murk is also one of the best dressings for the vineyard of any known, especially if mingled with dove or pigeon's dung. The murk is often dried from the press, and burned where fuel is scarce, being laid up for winter use, and dried, as tan is treated in some parts of England. Even the pips or seeds of the grape are applicable to useful purposes: pigeons delight in them; and the Italians extract from them an oil much superior to that from nuts, either for eating or burning.

ROCHESTER CASTLE.



[Interior of the remains of the Upper Story of Rochester Castle.]

Close by the side of the river, as we mentioned in our account of the 'City of Rochester' in our 94th Number, and immediately above the bridge, stands Rochester Castle; still, though now a bleak and roofless ruin, retaining many unobliterated features of its ancient vastness and magnificence. Its site is considerably elevated above the general level of the city; and, dilapidated as its walls are, they still tower far above all the other buildings in their neighbourhood, the pinnacles of the cathedral only excepted *. The principal part of the castle may, indeed, it is said, be seen from a distance of twenty miles.

* In our 97th Number the tower of the Cathedral was by mistake spoken of as surmounted by a spire. The spire was blown

The fancy of our old chroniclers and legendary writers, which has adorned so many of our cities and buildings with a fabulous antiquity, has not forgotten the Castle of Rochester. In reference to the stories which have been invented with the view of giving it as illustrious an origin as possible, we may adopt the sensible language of the antiquary William Lambarde, who, in his 'Perambulation of Kent,' (written in 1570,) says:—"Some men (desirous belike to advance the estimation of this city) have left us a far-fetched antiquity concerning one piece of the same, affirming that Julius Cæsar caused the Castle at Rochester (as also that other at Canterbury, and the Tower at London) to be builded of common charge: but I, having not hitherto read any such thing, either in Cæsar's own Commentaries, or in any other credible history, dare not avow any other beginning of this city or castle than that which I find in Beda."

Bede's account is, that Rochester took its name from one Rof or Rhof, who was once lord of it; but we have already shown that there is, in all probability, no foundation for this etymology. As Rochester, however, was a military station in the latter times of the Roman empire in Britain, there is reason to believe that a fort occupied the site of the present castle, the position of which is exactly such as would have recommended it for such an erection. Many Roman coins have been found within the circuit of the castle, but none in any other part of the city; from which we may conclude that this was the only part of the city which existed in the time of the Romans. This supposition is still further confirmed by the language of documents of the Saxon period, which speak of the place as still merely a castle. Indeed the name Rochester, as already explained in our former notice, is an evidence that the station was originally merely a chester, castrum, or camp, and that the town has gradually grown up around the military fort.



[Gateway of Rochester Castle.]

If the Saxons had a castle here, which is by no means proved by the place having been called by them Castrum or Castellum, certainly no part of any such building

down some years ago, and its place has been supplied by four tall pinnacles rising from the angles of the tower, as may be seen in the view of the city given in the Magazine. No. 94.

now remains. The oldest portion of the present ruin is in the early Norman style of architecture. The building was probably the work of the Conqueror,—one of the many strongholds which he erected in all parts of the country to maintain his foreign dominion. Here it appears that his illegitimate brother, the famous Odo, Bishop of Bayeux and Earl of Kent, resided, and kept his court as a sort of petty sovereign of the county. After the death of the Conqueror, Odo, who espoused the cause of his eldest son Robert, shut himself up in this castle, and being joined by many of the nobility, for some time resisted the arms of Rufus. The rebels were, however, at length reduced. In the latter part of this, or the commencement of the following reign, the vast and lofty tower which now forms the principal part of the ruin, is said to have been built by the famous Bishop Gundulph. But if the bishop's whole expenditure, as is asserted, was only "three score pounds," comparatively cheap as labour and materials then were, he could not with that sum have advanced such a building very far. It is not improbable, therefore, that the tower was completed, and indeed principally constructed, at the expense of the Archbishop of Canterbury, to whom the castle was granted by Henry I., and by whom it is known that extensive repairs and improvements were executed upon the fabric. "By means of which cost done upon it at that time," says Lambarde, "the Castle of Rochester was much in the eye of such as were the authors of troubles following within the realm, so that from time to time it had a part almost in every tragedy."

In the reign of John, Rochester Castle was taken possession of, first in 1215, by the insurgent barons, who were, however, after some time, obliged to surrender to the king's forces, and, in the following year, by the Dauphin of France, whom they had called over to their assistance. In the time of the next king, Henry III., its strength was again attempted to be turned against the crown, having, in 1264, immediately after the battle of Lewes, been attacked by the victorious Montfort, Earl of Leicester. This celebrated person, Lambarde tells us, "girded the city of Rochester about with a mighty siege, and setting on fire the wooden bridge, and a tower of timber that stood thereon, won the first gate or ward of the castle by assault, and spoiled the church and abbey; but being manfully resisted seven days together by Earl Warren that was within, and hearing suddenly of the king's coming thitherward, he prepared to meet him in person, and left others to continue the siege, all which were soon after put to flight by the king's army."

The last repair of the building that is recorded to have taken place was in 1461, in the reign of Edward IV. Since then it appears to have been almost entirely neglected, and has been allowed gradually to fall into the ruinous state in which it now appears, though not without the waste of time having been assisted by active dilapidation. The ruin, which is now the property of the Earl of Jersey, occupies a quadrangular space of about three hundred feet in each dimension. The north, south, and east sides had been formerly defended by a deep ditch; but that is now filled up. The river flows on the west side. The walls are, for the most part, built of rough stones from Caen, bound together by a cement which has now become extremely hard. Their thickness varies from eleven to thirteen feet. Fragments of several towers still remain at the angles, and in other parts of the building; but of these there is no other to be compared in magnitude to that called Gundulph's Tower, which has been already mentioned, and which stands at the south-east angle of the castle. This is a quadrangular erection, each side of which, at the base, is not less than seventy feet long, while the height of the whole is a hundred and twelve feet. The walls incline slightly inwards as they rise from the ground. Attached to the east angle is a smaller

tower, between seventy and eighty feet in height, which is to be considered as part of the same erection. These two towers appear to have contained the principal apartments of the castle, and they have evidently been laid out so as to afford accommodations of princely magnificence. A partition wall, of five feet in thickness, runs up the middle of the larger tower, from the ground to the roof; and the height has been divided into four successive stories by three floors, the marks of which on the walls are still perfectly discernible, although the joists and boards of which they consisted have long been removed. They were used, it is said, in building a brew-house on the neighbouring common. Each of the six rooms measures, in the interior, forty-six feet in length by twenty-one in breadth. The height of those on the ground floor is thirteen, that of those in the second story twenty, that of those in the third story thirty-two, and that of those in the fourth story sixteen feet. Winding-stairs of about five feet and a half in width, now much decayed, occupy the east and west angles, and open into every apartment. There are also communications on each floor between the two parts of the tower, by arched door-ways formed in the partition wall. In the third story, where the state apartments appear to have been, these arches, which are four in number, are richly ornamented, and are eighteen feet in height, each of the three columns which divide them being four feet in diameter. Through this central partition, also, a well, two feet nine inches in diameter, ascends to the summit of the building, communicating with each floor as it passes up. The rooms have all fire-places; but there are no chimneys, the vent for the smoke being merely a hole formed in the outer wall immediately above the fire-place. Other larger openings serve for the admission of light and air. The roof of the highest rooms is ninety-three feet in height from the ground, and beyond that there is an uncovered battlement rising seven feet higher. Finally, the towers at the four corners ascend to the height of twelve feet above the termination of the battlement.

OLD TRAVELLERS.—WILLIAM DAMPIER.—No. 1.

This extraordinary man, whose whole life seems almost to have been spent in distant wanderings and adventures, was born in the year 1652, in the county of Somersetshire. Little is known of his early circumstances, but his family appears to have been respectable, and to have afforded him the means of a common day-school education, though nothing more. His father, however, dying when he was young, William, having given a decided preference to that calling, went to sea, as apprentice to the captain of a Newfoundland trader. His first voyage was to France, and his second to Newfoundland, where the intense cold sickened him of the particular trade in which he was then engaged. Returning to England, and being more than ever anxious to see the world, he determined to try a warmer climate, and accordingly embarked in an East Indiaman as a common sailor. In this capacity, and when he was little more than seventeen years of age, he made a voyage to Bantam.

We next hear of him in the king's service, and as a man already distinguished as an able mariner. In the Dutch war he served under Sir Edward Sprague as a man before the mast, and was present in two engagements

He was then obliged by ill health to pass a few months quietly ashore. He lived, during this time of brief repose, with a brother, who seems, like the father in that beautiful truth-like fiction—'Robinson Crusoe,'—to have opposed the wandering inclinations of the sailor, and with want of similar success. As soon as the state of his health permitted, he went out to Jamaica; his honesty, activity, and talent, having recommended him to a planter, who was happy to engage him as under-manager of one of his estates. This employment, though sufficiently lucrative, was much too fixed and uniform for Dampier's disposition; he says, he soon found he was "completely out of *his* element:" accordingly he quitted it, and again turning to his favourite element, the sea, he embarked for Port Royal, where he engaged "with one Mr. Fishook, who traded to the north side of the island of Jamaica, and sometimes round it." In this service he attentively studied, and made himself acquainted "with all the ports and bays about Jamaica, and with all their manufactures; as also with the benefit of the land and sea-winds." Such application to the more important parts of his profession is as rare as it is laudable in a common sailor not twenty-three years of age.

In six or seven months he grew tired also of this confined, coasting navigation, and shipped himself "aboard one Captain Hudsel, who was bound to the bay of Campeachy to load log-wood." This voyage was beset with dangers in an extraordinary degree:—the vessel, on her return, was nearly taken by some Spanish cruizers, who, acting in the barbarous spirit of those times, would have made Dampier and all on board slaves; soon after she struck on a sand-bank, where she was well nigh lost; and towards the end of the voyage her provisions ran so short that there was risk of starvation. At length, however, they reached Port Royal, "and so," says our adventurous seaman, who never makes much of his dangers, "ended this troublesome voyage." During its prosecution he obtained new and important nautical information concerning the Alcrane reef, the Colorado shoals, the grand Caymanes, and other dangerous places then very imperfectly known. He says himself that "in all these rambles we got as much experience as if we had been sent out on a design," *i.e.*, on a voyage of survey. But Dampier seems to have been the only person of the company capable of making proper observations and notes of all he saw and learned, and preserving them for the future guidance of seamen.

In Campeachy Bay he had seen, among the log-wood cutters, a scene of independence—an adventurous mode of life,—a field for enterprise, with "a great prospect of getting money, if men would be but diligent and frugal," that perfectly suited his ardent disposition. Almost as soon, therefore, as he was "paid off" from his last ship, he purchased hatchets, axes, long knives, saws, wedges, a moschito tent to sleep in, a gun, a supply of powder and shot, with other things proper for the new kind of life he contemplated, and sailed again for Campeachy. Reaching that place in safety, he settled among two hundred and sixty or two hundred and seventy logwood men, who were chiefly English, who had all been buccaneers, and who were then living at large, with no laws but their own will or caprice,—in a sort of republic which, in several respects, would have exactly suited Trinculo, the drunken boatswain in Shakspeare's 'Tempest.' Their manner of living, which was certainly not without its hardships, is admirably described by Dampier. Their abodes were log-huts covered with palmeto leaves to defend them from the violent and soaking rains; they were erected close by creeks or inlets, for the benefit of the sea breezes during the oppressive heats, and as near to the logwood groves as possible, that they might not have to carry the heavy material far. As they exhausted the trees, they removed their huts to another grove. Their bedding was a wooden frame raised three feet and a half above the ground,—four stakes or poles, rising above this frame, supported a light tent, "out of which here is no sleeping for moschitoes." Another frame covered with earth served as a cooking-place, and for stools and chairs they used logs. "During the wet season," says Dampier, "the land where the logwood grows is so overflowed that they step

from their beds into the water, perhaps two feet deep, and continue standing in the wet all day, till they go to bed again; but nevertheless account it the best season in the year for doing a good day's labour in."

For food they hunted the wild cattle, with which, and with alligators, the savannahs of the country swarmed. "When they have killed a beef," says Dampier, "they cut it into four quarters, and, taking out the bones, each man makes a hole in the middle of his quarter, just big enough for his head to go through, then puts it on like a frock and trudgeth home; and if he chances to tire, he cuts off some of it and flings it away."

For flour, bread, and most other luxuries, they depended on the ships that visited them to purchase their logwood. The arrival of one of these vessels was a signal for the commencement of a scene of almost general riot and debauchery; and in a few days these uneducated, imprudent men would spend the earnings of months of hard labour in a dreadful and dangerous climate, where, moreover, they were constantly liable to be surprised by the Spaniards, who, with some reason, denied the legality of their settlement, and who treated them as pirates, and made slaves of those they took.

From the high prices logwood then commanded, there was indeed, as Dampier observed, "a great prospect of getting money." Comparatively handsome fortunes might have been made in a short time by industry and thrift, but these virtues could scarcely exist in a society of buccaneers, who, so far from having relinquished their old habits, still made incursions "among the nearest Indian towns, which they plundered, and brought away the Indian women to their huts, and sent their husbands to be sold at Jamaica." It was the immoderate use of the rum of that island that confirmed their vices, drained their purses as fast as robbery or labour could fill them, and kept these ignorant sailors constantly poor and desperate. Dampier, who frequently laments these vices, which, however, he must have been prepared to expect, says, in his quaint way, "Besides, they had not their old drinking bouts forgot, and would still spend £30 or £40 at a sitting, aboard the ships that came hither from Jamaica, carousing and firing off guns for three or four days together. And though afterwards many sober men came into the bay to cut wood, yet, by degrees, the old standers so debauched them that they could never settle under any civil government."

How our traveller should have stayed, as he did, for nearly three years among such men, and have escaped the moral contagion, is truly astonishing. During this residence he diligently collected the most valuable information concerning the natural history of those parts of the western world, the winds, currents, coasts, and about all subjects of importance to the nautical profession. All this Dampier performed while working as a common logwood cutter in the Bay of Campeachy.

Instead of spending his money in rum, like the rest, he saved it, and, at the end of his labours, returned to Jamaica in 1678, and thence to England, with capital sufficient to start him again in an advantageous manner. His old comrades at Campeachy, some time after his departure, met a tragical fate: the Spaniards, seeing their careless way of living, fitted out an expedition which surprised them in their huts, and either butchered them or made them prisoners. The prisoners were sent up the country and sold as slaves.

Our traveller arrived at London in the beginning of August, 1678, and at the beginning of the following year, he says, he set out again for Jamaica, "in order to have gone thence to Campeachy; but it proved to be a voyage round the world."

He invested the money he had made as a logwood cutter in English merchandise, which he sold at Jamaica, where he intended "to stock himself with rum and sugar, saws, axes, hats, stockings and shoes, and such other commodities as would sell among the Campeachy logwood-cutters;" for his past experience did not deter him from revisiting that wild place. Circumstances, however, occurred which changed his plans, and he remained all that year at Jamaica in expectation of some other business in which to employ his capital. While there, he happened to hear that a person residing on the island had "a small estate" for sale; and as it was in Dorsetshire, "near his native county of Somerset," (it is interesting to observe these local attachments in such a man) Dampier bought it. He says, "I was just embarking myself for England, about Christmas, 1679, when one Mr. Hobby invited me to go first a short trading voyage to the country of the Moschitoes*. I was willing to get up some money before my return, having laid out what I had; so I sent the writing of my new purchase along with the same friends I should have accompanied to England, and went on board Mr. Hobby."

At this time the buccaneers, whom Dampier calls "privateers," had again mustered in great force, and it was our traveller's fortune to fall in with them, at the western extremity of Jamaica. Seduced by the splendid prospects presented to them by the marauders, every man on board Hobby's ship, except himself and Dampier, went and joined them; "and being thus left alone," says our adventurer with admirable coolness, "after three or four days' stay with Mr. Hobby, I was the more easily persuaded to go too."

It must excite our reader's surprise to see how readily a man of a decent character and of an enlightened mind joins an association which we fear, after all, we must denominate piratical. A short account of those bodies, and of the notions of right and wrong prevalent at the time, will somewhat diminish this astonishment, and is necessary to make out Dampier's curious history.

The Spaniards, who were the discoverers of America and the first European settlers in the West Indies, were actuated by a most jealous and illiberal spirit, astonishing even at that period, when the true nature of commercial intercourse was not understood, and when even the simplest rules of political economy were generally unknown.

Spain, indeed, considered the New World as treasure-trove, of which she was lawfully and exclusively the mistress. A bull of the Roman Church, granted by Pope Alexander VI., gave what was then esteemed as a sacred recognition of these exclusive rights, and the government of Spain determined, that none but Spaniards should trade with, or land upon, the American continent and islands. Such folly must now appear unaccountable, but it is an historical fact, that the Spaniards at first fancied they could keep their discoveries in the West Indies a secret from the rest of the world, and prevent the ships of other nations from finding their way thither. Not all the power of Spain, comparatively great as it then was, nor all the cruelty exercised in support of her extravagant pretensions, could deter the enterprising mariners of France and England from attempting to share in the greatly-exaggerated wealth of the New World. As early as 1526, one Thomas Tyson was sent to the West Indies as factor for some English merchants, and many adventurers soon followed him. The French began to increase in that part of the world about the same time. All these men went with the certainty of meeting with hostility from the Spaniards, and with the determination of returning it with hostility. To repress these intruders the Spaniards employed armed ships, or guarda-costas, the commanders of which were instructed to take no prisoners! On the other hand, the English and French, to whom were soon joined many Dutchmen and some Portuguese, closely combined among themselves, treated every Spanish ship as an enemy, made descents on the coasts, ravaging the towns and settle-

* The Moschito Indians lived on the Isthmus of Darien.

ments of the Spaniards, and repaid cruelty with cruelty. A continual warfare was thus established between Europeans in the West Indies, entirely independent of the governments of their respective countries. All Europeans, not Spaniards, whether there was peace or war between their nations in the Old World, on their meeting in the New, regarded each other as friends and allies; they styled themselves "Brethren of the Coast," and held the Spaniards as their common foe.

When not engaged in predatory expeditions, the principal occupation of these men was hunting wild cattle; but this they did not begin to do till some years after their first appearance in the West Indies: at a still later period many of them became logwood-cutters in the Bay of Campeachy, as we have already shown. As hunters, they could turn the hides, suet, and dried meat of the wild beeves to good account; as wood-cutters their calling was yet more profitable; and had the Spaniards permitted them to follow these occupations in peace, it is reasonable to suppose that they would gradually have settled into inoffensive members of society, or, at least, that they never would have formed such numerous and desperate bands as they did eventually. But the Spaniards regarded every rood of land as their own, and, in their unwise jealousy, would not permit any other people to derive advantage even from those vast tracts of country which they themselves had no population to occupy, and which, in many instances, they had scarcely seen, until, attracted by the news that Europeans had settled in them, they went to burn, destroy, and murder.

When the court of Spain made formal complaints to the different governments of Europe, of which the adventurers in the West Indies were the natural subjects, the general answer received was, "that the men, against whom they complained, acted entirely on their own authority and responsibility, not as the subjects of any prince, and that the King of Spain was at liberty to proceed against them according to his pleasure." Far different, however, was the reply of our high-minded Queen Elizabeth. She said boldly, "that the Spaniards had drawn these inconveniences upon themselves by their severe and unjust dealings in their American commerce; for she did not understand why either her subjects, or those of any other European prince, should be debarred from traffic in the West Indies. That as she did not acknowledge the Spaniards to have any title by the donation of the Bishop of Rome, so she knew no right they had to any places other than those they were in actual possession of; for, that their having touched only here and there upon a coast, and given names to a few rivers or capes, were such insignificant things as could no ways entitle to a proprietry further than in the parts where they actually settled and continued to inhabit *."

This remonstrance had no effect on the Spaniards, who continued to treat the adventurers not of their nation as lawless intruders, and to torture and exterminate them whenever they had an opportunity. Such cruelties were much circulated, and probably much exaggerated in Europe, in the form of popular stories, and produced a great effect. One Montbars, a Frenchman, on reading a narrative of this kind conceived such a deadly hatred against the Spaniards, that he went to the West Indies, became a buccaneer, and pursued his vengeance with so much success, that he obtained the title of "The Destroyer."

As the arms of the buccaneers were solely directed against the Spaniards, all the other European nations who gradually made regular settlements in those parts, and lived under governors appointed by their several courts, regarded them as champions in the common cause. When any of those nations were at war with Spain, they granted regular commissions to the buccaneers, who then acted as privateers in their country's service. From these and other circumstances the buccaneers obtained great power, and even temporary respect. Many men of respectable lineage and education joined their association; nor were they considered as robbers and sanguinary pirates, until later, and more settled and more moral times. Peter of Dieppe, called "Peter the Great," L'Olonnais, Le Basque, and Mansvelt, were among the most celebrated of the buccaneer captains, but their fame was eclipsed by a Welchman, named Henry Morgan, who, after many successes, about nine years before Dampier's expedition, had crossed the isthmus of Darien to the South Sea, and taken and plundered the rich city of Panama.

* Camden.

All these commanders were detestably cruel, but at the period when Dampier agreed to take part in their adventures, the buccaneers, generally, were much more humanized. The vices of drunkenness and gambling still, however, prevailed among the majority; who, after a life of almost unceasing danger, perished prematurely in battle, by accident, or by disease. A few of them merited and found a better fate,—and these few were men who had cultivated their minds, who were fond of reading, who delighted in examining the wonderful varieties of nature presented to them in the course of their wanderings, and who, in such resources, found sufficient amusement without drinking or playing.

[To be continued.]

Tyranny of Fashion.—The abominable custom of flattening their heads prevails among the Indians of North Western America. Immediately after birth the infant is placed in a kind of oblong cradle, formed like a trough, with moss under it. One end, on which the head reposes, is more elevated than the rest. A padding is then placed on the forehead, with a piece of cedar-bark over it, and by means of cords passed through small holes on each side of the cradle the padding is pressed against the head. It is kept in this manner above a year, and is not, I believe, attended with much pain. The appearance of the infant, however, while in this state of compression, is frightful, and its little black eyes, forced out by the tightness of the bandages, resemble those of a mouse choked in a trap. When released from this inhuman process, the head is perfectly flattened, and the upper part of it seldom exceeds an inch in thickness. It never afterwards recovers its rotundity. They deem this an essential point of beauty, and the most devoted adherent of our first Charles never entertained a stronger aversion to a *Roundhead* than these savages.—*Ross Cox's Adventures on the Columbia River.*

The practices of savages have sometimes a parallel in those of civilization. A quarter of a century ago,—at most half a century,—it was the custom of nurses to bind infants so tightly round the body with swaddling-clothes, that the natural form of the chest was altered. Some young ladies still do the same with stays.

The Affection of a Wolf.—"By way of enlivening the description of the structure of animals, he (M. de Candolle, Lecturer on Natural History at Geneva) introduced many interesting particulars respecting what he called *leur morale* or their natural dispositions, and the changes they underwent when under the dominion of man. Among other instances of the affection which wolves had sometimes shown to their masters, he mentioned one which took place in the vicinity of Geneva. A lady, Madame M———, had a tame wolf which seemed to have as much attachment to its mistress as a spaniel. She had occasion to leave home for some weeks: the wolf evinced the greatest distress after her departure, and at first refused to take food. During the whole time she was absent, he remained much dejected on her return, as soon as the animal heard her footsteps, he bounded into the room in an extasy of delight; springing up, he placed one paw on each of her shoulders, but the next moment he fell backwards and instantly expired."—*Bakewell's Travels in the Tarentaise*, &c., vol. ii., p. 153.

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

LONDON:—CHARLES KNIGHT, 22, LUDGATE STREET, AND 13, PALL-MALL EAST.

Printed by William Clowes, Duke Street, Lambeth.

attitudes. But they were nevertheless highly popular; and as the pictures were accompanied with a few sentences from Scripture, they probably supplied the first inducement to the laity to learn to read, and thus prepared the way for that diffusion of knowledge which was to accompany the invention of printing from moveable types. Again, for somewhat more than a century preceding the period of which we are speaking *, playing-cards had become the common amusement of the noble and wealthy. The cards, like the missals, called forth the art of the limner; and the king, the knight, and the knave (the characters of the early cards), were rich with crimson and purple, oftentimes painted on a golden ground. Gambling, like many other vices and follies, descends from the great to those below them in the social scale; and it is easy, therefore, to conceive that the followers of courts and of camps, and the artisans and dealers in the towns, seeing the amusement which their superiors derived from these painted bits of paper or parchment, would be anxious to possess the same means of excitement in their hours of idleness. The art of wood-engraving was ready to supply the extended demand for playing-cards. The outline of the figure was cut in relief upon a block; and the coloured parts were afterwards added by the pencil. In Mr. Singer's elaborate and interesting work, there are many fac-similes of the early cards. We subjoin a specimen of the *Knave of Bells*:—



[Knave of Bells.]

It appears that the impressions of the engraved cards, as well as of most of the earlier block-prints, were taken off by friction. This is the mode by which, even at the present day, wood-engravers take off the specimen impressions of their works, called proofs. The Chinese produce their block-books in a similar manner, without the aid of a press.

In the collection of Earl Spenser there is a very curious print from a wood-block, representing St. Christopher carrying the infant Saviour. This print bears the date 1423. It is probably not the earliest specimen of the art; but it is the earliest undoubted document which determines with precision the period when wood-engraving was generally applied to objects of devotion. In a very few years from the date of this print, the art was carried onward, as we have mentioned, to a more important object,—that of producing a *book* of popular instruction. The Bible, as is well known, could only at this time be obtained in manuscript, at a very heavy cost; such as would purchase a considerable estate in those days. It was thought that a selection of subjects from the Bible, with appropriate texts, both engraved upon wood, might be acceptable to the common people. Such a book was produced somewhere between the year 1430 and 1450, and was called 'Biblia Pauperum,'—the Bible of the Poor. This very rare book consists of forty leaves of small folio, (about the size of the 'Penny Magazine,') each of which contains a cut in wood, with extracts from the Scriptures, and other illustrative sentences. It was followed by others of a similar character, the most remarkable of which is called 'Speculum Salutis,'—the Mirror of Salvation. In this performance the explanations of the text are much fuller than in the 'Biblia Pauperum;' and it is remarkable that, in one of the editions, part of the text is obviously printed from blocks, and part from moveable types. In addition to these works, wooden blocks were also used to print small manuals of grammar, called Donatuses, which were used in schools. We subjoin a fac-simile of a wood-cut from one of the early block-books.

* This is much earlier than the date usually assigned to the introduction of Playing Cards; but there is abundant proof that they were used in Italy, Spain, and Germany, for at least a century preceding the reign of Charles VI. of France. See Singer's 'Researches into the History of Playing Cards.'



[The Wise Men's Offering.]

In the course of this Number we shall see how the art of engraving on wood, and the production of block-books, gradually merged into the art of printing from moveable types. From that time wood-cuts became a secondary part of books, used, indeed, very often by the early printers, but by no means forming an indispensable branch of typography. Imitating the manuscript books, the first printers chiefly employed the wood-engraver upon initial letters; and sometimes the pages of their works were surrounded by borders, which contained white lines or sprigs of foliage upon a black ground. If a figure, or group of figures, was introduced, little more than the outline was first attempted, as will be seen in the fac-simile from the 'Historiæ Veteris et Novi Testamenti' just given. By

degrees, however, endeavours were made to represent gradations of shadow; and a few light hatchings, or white dots, were employed. All cross-hatchings, such as characterize a line engraving upon metal, were carefully avoided by the early wood-cutters, on account of the difficulty in the process. Mr. Ottley, in his 'History of Engraving,' says that an engraver on wood, of the name of Wohlgemuth, (who flourished at Nuremburg about 1480,) "perceived that, though difficult, this was not impossible;" and, in the cuts of the 'Nuremburg Chronicle,' "a successful attempt was first made to imitate the bold hatchings of a pen-drawing." Albert Durer, an artist of extraordinary talent, became the pupil of Wohlgemuth; and by him, and afterwards by Holbein, wood-engraving was carried to a perfection which it subsequently lost till its revival in our own country, by Bewick. For more than a century and a half after the invention of printing in England, as well as in France, Holland and Germany, wood-cuts were profusely employed in the illustration of books. Those who have seen copies of the original editions of those very popular English works, 'Hollingshed's Chronicles' and 'Fox's Martyrs,' will perceive how attractive and really instructive wood-cuts were considered in the sixteenth and early in the seventeenth century. Wood-cuts are indeed essentially applicable to the general diffusion of knowledge; and the early printers were as much engaged in that great task as we of the present day, who are anxious to carry information into the dwellings of the peasant and the artisan, and to excite the curiosity of those who have been unaccustomed to think upon any subject connected with art and literature. The early printers had to seek for their most numerous class of customers among the laity, (persons not of the religious profession,) who, we have seen, were considered unworthy of the perusal of the monastic manuscripts. These, undoubtedly, were for a long time surrounded with every difficulty in the acquisition of knowledge. Many, even of the wealthier classes, were unable to read their own language; few understood the learned languages, in which the larger number of books were printed; and the greater part required some excitement to their curiosity before they seriously applied themselves to the perusal of a book, even if they possessed the ability. The liberal introduction of wood-cuts furnished a great attraction. After the first expenses of the drawing and engraving were incurred, there was no separate cost in taking off the impressions of the cuts;—they were executed by the typographical process, and thus formed an integral portion of the books. Gradually, however, as the original readers of books,—namely, the nobility and other possessors of property in land, and a few of the wealthier of the mercantile class,—desired a species of embellishment more costly than wood-cuts, though in many cases not superior, copper-plate prints began to be introduced into printed works. Impressions of these prints were obtained by a process totally different from the typographical art; so that they constituted, in every respect, an additional expense in the production of a book. Sir John Harrington's translation of 'Orlando Furioso' was the first English work in which copper-plates were used; this was printed in 1690. From this time till the latter part of the eighteenth century, the use of wood-cuts gradually declined in England. The rudest illustrations, as rude as those of the 'Biblia Pauperum,' were sometimes found in Primers and Spelling-books; but as a high branch of art wood-engraving was entirely lost till the appearance of Bewick, a most ingenious artist, who practised at Newcastle upon Tyne. His cuts of quadrupeds and birds are as remarkable for their force and delicacy of execution as engravings, as for the vigour and accuracy with which he drew them; and his humorous vignettes possess a truth of character which has been seldom equalled. The success of Bewick created several artists in wood, of considerable excellence; but, till within a very few years, the art was not applied to its legitimate purpose. It is essentially the art of design which is naturally associated with cheap and rapid printing. The wood-engravers who were contemporary with, or immediately succeeded, Bewick, were generally employed in the illustration of the most costly works; and the introduction of wood-cuts often rendered the printing of the other portions of the book so expensive, that a volume thus embellished was as costly as if the designs had been printed separately from metal plates. The reason was this:—from the mode in which these engravers worked, the most extraordinary care was required in printing their performances; and the wood-cuts being included in the same page and sheet with the text, if only a single wood-cut occurred in a sheet, the attention which that demanded from the pressman prevented the rapid working-off of the other pages. This we shall explain more fully when we come to treat of the press and printing-machine. It may be sufficient now to state that as, by the printing-machine, the ink is uniformly applied to wood-cuts as well as types, and as the cylindrical pressure of the machine is also uniform, no peculiar care of the superintendent can remedy defects or heighten beauties in the work of the engraver. He must, therefore, give his shadows the requisite force, and his lights the necessary clearness, when he completes his work. No subsequent care can alter its appearance. He, therefore, adapts his performance to the circumstances dependent upon rapid printing;—and it is not too much to say that these circumstances, principally exhibited and called forth by the great demand for the 'Penny Magazine,' have completely changed the character of the art of wood-engraving; and have rendered it peculiarly and essentially that branch of engraving which is applicable to cheap publications.

We may illustrate these remarks by referring to the cut at the head of this Number. It has been engraved as a specimen of his art, by Mr. Jackson,—one of the best wood-cutters of our day; who, in conjunction with Messrs. Sly and Wilson, has principally executed the cuts of the 'Penny Magazine.' This wood-cut is copied from one of the finest line-engravings of Raffaelle Morghen, and furnishes a true notion of the bold style of cross-hatching which that great artist adopted. It must be evident that these cross-lines are much more difficult to produce in wood than in copper or steel. In metal, the lines to be shown in the impression are cut away in the plate; in wood they are left standing, and the white between the lines is cut away. Of course it is much more laborious to cut away the minute white spaces formed by the intersections of the lines, than to follow with the graver the lines themselves. A writer in Brewster's 'Edinburgh Encyclopædia,' speaking of this peculiarity of the fine old wood-engravers, says, "In looking at the works of the old German artists, from the time of Albert Durer down to Christopher Jegher, we are surprised at the frequent occurrence and freedom of execution of the dark cross-hatchings,—an operation which, by the common process of cutting away the interstices, could not be done but with the greatest labour, and certainly without the freedom which these artists have displayed." The writer then goes on to suggest that these hatchings were not done by the tool, but corroded by some chemical process. Now, in the cut of the Madonna, no chemical process is used; and we think there is no want of freedom. The only secret in the matter is, that the artist is paid liberally for the great labour of the performance; and the means of paying him liberally are afforded by the circumstance that two hundred thousand purchasers co-operate to obtain a fine specimen of his art. By the adaptation of wood-engraving to the necessities of rapid printing, the impressions of a cut like this can be produced (and we think it will bear comparison with many

specimens of wood-engraving printed with the most expensive care) at the rate of eight hundred an hour or ten thousand a day; and thus a fine specimen of art can be placed within the reach of thousands, instead of being confined to the cabinets of a very few, as the print of Raffaelle Morghen is, from which it is copied.

It may be expected that we should add a short description of the process of engraving on wood.

In a 'Book of Trades,' published at Frankfort, in 1654, which was illustrated by a number of spirited wood-cuts from the designs of Jost Ammon, there is a representation of the *formschneider* or wood-cutter. He sits at a table holding the block in his left hand, upon which he is cutting with a small graver in his right. Another graver, and a sort of googe or chisel lies upon the table. If we enter the work-room of a wood-engraver of the present day, we shall find the instruments by which he is surrounded nearly as few and as simple. His block rests upon a flat circular leather cushion filled with sand; and this so completely answers the purpose of holding the block firmly, and yet allowing it to be moved in every direction, that it is expressively called the wood-cutter's third hand. His cutting instruments are of three sorts: the first, which is called a *graver*, is a lozenge-shaped tool, used for outlines and fine tints; the second, called a *scauper*, which presents a triangular point and edges, is used for deeper and bolder work; and the third, which is a *flat tool* or chisel, is employed in cutting away those parts of the block which are to be left entirely light. There are several varieties of size in these tools, but it is understood that the best artists employ the fewest tools. Upon the block, which presents a perfectly smooth surface, the design has previously been drawn, in most cases with a black-lead pencil, by a draughtsman, who is generally an artist distinct from the wood-engraver. It is the business of the cutter, as we have before mentioned, to leave all the lines upon the block which the draughtsman has traced with his pencil; and to do this, he of course cuts away all the parts which form the spaces between the various lines of the drawing. The lines thus stand up, as it is called, in relief; and when ink is applied to them by the printer, in the same way as he applies it to his metal types, they transfer the ink to the paper placed over them upon being subjected to an adequate pressure. We should mention that in this, as in every other species of engraving, the drawing upon the wood is a reverse of the object copied, in the same way as a mirror shows the reverse of the human countenance; when the impression is taken from the engraving, the object is correctly represented, in the same way as the reflection of any object in a second mirror placed opposite the first would also give it correctly. The process we have alluded to, by which the art of wood-engraving is adapted to the uniform printing effected by the revolving cylinder of a machine, consists in very much lowering the general surface of the wood wherever light tints are required to be produced. For example, the thigh of the infant in the wood-cut of the Madonna at the head of this paper, exhibits a number of faint lines, which are gradually lost in complete light. This is effected by scooping out the wood like a shelving trench from the edge of the shadow, and afterwards engraving the hatched lines upon the lowered surface. In a wood-cut executed ten years ago, the management of this effect would have been left to the printer; who, with great care and labour, would have contrived, by the adjustment of a number of small pieces of paper between the stretched parchment and blanket that covered the block during the impression from the common hand-press, to give a greater force to the bearing upon the shadows, while the lights were of course equally relieved from the pressure. By the mode of lowering the lights upon the block itself, the artist is sure that, with common care, every impression of his performance will be equally perfect. The process being a new one is, to a certain degree, imperfectly understood; but the great improvement which has progressively taken place in the appearance of the wood-cuts of the 'Penny Magazine,' is the best proof that a new principle has been introduced in wood-engraving, which, in time, will render a very high perfection perfectly compatible with that extreme cheapness of works in which wood-cuts are introduced, which is insured by the application of printing by machinery to the supply, with certainty and rapidity, of a large body of purchasers.

The wood which is used for the purpose of engraving is that of the box-tree. A considerable quantity of box is imported into this country, as the tree with us scarcely ever reaches a sufficient size. The best logs are shipped from Odessa, but very few are adapted for the purpose of the wood-engraver, and the inferior qualities are chiefly used for turnery. The blocks for engraving are cut directly across the grain, so that not many trees furnish pieces sufficiently large for the wood-cuts which we are in the habit of using, and in that case two or even three smaller pieces are fitted together with great exactness. The price of box for engravers has advanced considerably within the last year or two, owing, of course, to the increased demand. Some idea may be formed of this increase from the fact, that some twenty years since there were not more than about twelve working wood-engravers in London; there are now considerably more than a hundred. The encouragement afforded to this class of artists by works selling at a very cheap rate may be estimated, when we state that the wood-cuts of the 'Penny Magazine' cost about £2000 per annum. The impulse which the extension of the demand for reading has communicated to the business of wood-cutting in England has not yet been proportionately felt on the Continent. We ourselves supply metal casts to France, Germany, and Russia, not only to assist those countries in producing works similar to the 'Penny Magazine' at a cheap rate, but because, however excellent France and Germany may be in other branches of engraving, they have at present scarcely any wood-cutters amongst them. This is a singular contrast to the state of things in Germany soon after the invention of printing, when the wood-cutters, or *formschneiders*, were a body numerous enough to be incorporated distinct from the *briefmahlers*, or painters of cards and images.

The early history of wood-engraving, of which we have given a slight outline, clearly points out the successive steps in the perfection of the art of printing. The art of multiplying copies of drawings existed in Europe very early in the fifteenth century. It might have originated here, or it might have been copied from the Chinese; for Marco Polo, nearly a century earlier, had seen the paper-money of this people, on which "the principal officer, deputed by the cham, smears with cinnabar the seal consigned to him, and imprints it upon the money, so that the figure of the seal, coloured in cinnabar, remains impressed upon it*." However this may be, the use of carved blocks for the multiplication of copies of playing-cards and devotional pictures gave birth to a principle which has effected, and is still effecting, the most important changes in the world. These devotional pictures had short legends or texts attached to them; and when a text had to be printed, it was engraved in a solid piece as well as the picture. The first person who seized upon the idea that the text or legend might be composed of separate letters capable of re-arrangement after the impressions were taken off, so as to be applied, without new cutting, to other texts and legends, had secured the principle upon which the printing art was to depend. It was easy to extend the principle from a few lines to a whole page, and from one page to many, so as to form a book; but then

* 'Navigationi et Viaggi Raccolto da Ramusio.' Tome ii. fol. 29; quoted in Singer, page 85.

were seen the great labour and expense of cutting so many separate letters upon small pieces of wood or metal, and another step was required to be made before the principle was thoroughly worked out. This step consisted in the ready multiplication of the separate letters by casting metal in moulds. All these gradations were undoubtedly the result of long and patient experiments carried on by several individuals, who each saw the importance of the notion they were labouring to work out. It is this circumstance which has given rise to interminable controversies as to the inventors of printing, some claiming the honour for Coster of Haarlem, and some for Gutenburg of Mentz; and, as is usual in all such disputes, it was represented that the man to whom public opinion had assigned the credit of the invention had stolen it from another, who, as is also usual in these cases, thought of it in a dream, or received it by some other mysterious revelation. Those who desire to make themselves acquainted with the conflicting evidence on the origin of printing, will find ample accounts in 'Hansard's Typographia,' 'Singer on Playing Cards,' 'Bowyer's Origin of Printing,' 'Heinecken, Idée d'Estampes,' Ottley's 'History of Engraving,' and many other works; most of which in our opinion leave the matter quite as uncertain as many other subjects of antiquarian dispute, such as the birth-place of Homer, the site of Troy, the authenticity of Ossian, or the authorship of Junius. Our readers will probably be satisfied with the account of the invention given by an ancient German chronicler of the name of Trithemius, who appears to have personally known one of the three persons, who, as far as we may judge from the works which they produced, seem to have the best title to be called the inventors of printing:—

"At this time, in the city of Mentz on the Rhine in Germany, and not in Italy, as some have erroneously written, that wonderful and then unheard-of art of printing and characterizing books was invented and devised by John Gutenberger, a citizen of Mentz, who, having expended almost the whole of his property in the invention of this art, and on account of the difficulties which he experienced on all sides, was about to abandon it altogether; when, by the advice, and through the means, of John Faust, likewise a citizen of Mentz, he succeeded in bringing it to perfection. At first they formed (*i.e.*, engraved) the characters or letters in written order on blocks of wood, and in this manner they printed the vocabulary called a 'Catholicon.' But with these forms (or blocks) they could print nothing else, because the characters could not be transposed in these tablets, but were engraved thereon, as we have said. To this invention succeeded a more subtle one, for they found out the means of cutting the forms of all the letters of the alphabet, which they called matrices, from which again they cast characters of copper or tin of sufficient hardness to resist the necessary pressure, which they had before engraved by hand. And truly, as I learned thirty years since from Peter Opilio (Schoeffer) de Gernsheim, citizen of Mentz, who was the son-in-law of the first inventor of this art, great difficulties were experienced after the first invention of this art of printing, for in printing the Bible, before they had completed the third quaternion (or gathering of four sheets), 4000 florins were expended. This Peter Schoeffer, whom we have above mentioned, first servant and afterwards son-in-law to the first inventor, John Faust, as we have said, an ingenious and sagacious man, discovered the more easy method of casting the types, and thus the art was reduced to the complete state in which it now is. These three kept this method of printing secret for some time, until it was divulged by some of their workmen, without whose aid this art could not have been exercised; it was first developed at Strasbourg, and soon became known to other nations. And thus much of the admirable and subtle art of printing may suffice—the first inventors were citizens of Mentz. These three first inventors of printing (videlicet), John Gutenberger, John Fust, and Peter Schoeffer his son-in-law, lived at Mentz, in the house called Zum Jungen, which has ever since been called the Printing Office *."

The invention of Schoeffer, which, whatever might have been its first mechanical imperfections, undoubtedly completed the principle of printing, is more particularly described in an early document, which is given in several learned works on typography, as proceeding from a relation of Fust. It is as follows:—"Peter Schoeffer of Gernsheim, perceiving his master Fust's design, and being himself ardently desirous to improve the art, found out (by the good providence of God) the method of cutting (*incidendi*) the characters in a matrix, that the letters might each be singly cast, instead of being cut. He privately cut matrixes for the whole alphabet; and, when he showed his master the letters cut from these matrixes, Fust was so pleased with the contrivance, that he promised Peter to give him his only daughter Christina in marriage; a promise which he soon after performed. But there were as many difficulties at first with these letters, as there had been before with wooden ones; the metal being too soft to support the force of the impression: but this defect was soon remedied by mixing the metal with a substance which sufficiently hardened it†." John Schoeffer, the son of Peter, who was also a printer, confirms this account, adding, "Fust and Schoeffer concealed this new improvement by administering an oath of secrecy to all whom they intrusted, till the year 1462, when, by the dispersion of their servants into different countries, at the sacking of Mentz by the Archbishop Adolphus, the invention was publicly divulged."

The original type was very similar to that which is still used most generally in German books. This is called the Gothic character, while the ordinary type which we employ is known as Roman. It derived that name from the first printers who used it, namely, Sweynheim and Pannartz, who, in 1467, executed in this type an edition of Cicero's 'Epistolæ Familiares,' at their office in Rome. The Italic type was the invention of Aldus Manutius, the first of a celebrated family of printers, who employed it not as we do very sparingly in quotations, but in the execution of a series of small classical works intended for general perusal. The object which he had in view was the saving of space, as the Italic letters, from their peculiarity of form, are thinner than the Roman or the Gothic. It is said, that in this character Aldus attempted an imitation of the hand-writing of the celebrated poet, Petrarch. His printing office was established at Venice, in 1490.

The original attempts to preserve the whole process of printing a secret, and which, no doubt, continued for a long time under that state of things when every trade was denominated a mystery, led to the union of the letter-founder and the printer. The division of labour (the progress of which principle is at all times slow) was little understood at that period, when the weaver manufactured his own loom, and the farmer constructed his own rude plough. Schoeffer, one of the first German printers, was also the first letter-founder; and he was, moreover, a book-binder. The general term printing originally included every process necessary for the production of a book, from cutting the punch by which the matrix is sunk, to stamping the leather which covered the ponderous wooden lids of the treasured folio.

The English printers, from Caxton to John Day, (who, in the year 1567, published a book of antiquities, in which he says that the Saxon characters were cut by himself,) were all letter-founders. The trades, however, after this began to be separated, for we find a decree of the Star Chamber, in 1637, by which it is ordered that

* 'Trithemii Annales Monasterii Hirsaugensis.' Translated in Singer.

† Bowyer's 'Origin of Printing,' p. 91.

there shall be four founders of letters for the kingdom, and no more. The provisions of this absurd and oppressive decree were recognized in an act of 14th Charles II., (1674,) which again restrained the number of master-founders to four; and, by the same act, the number of printers was limited to twenty. This, however, was only a provisional act, which appears to have been impossible of execution, like all other enactments which are directly opposed to the spirit of an age. The demand for knowledge had become so general that four founders and twenty printers were quite inadequate to the supply, whatever might be the opinion of Charles II. and his arbitrary court. The supply, therefore, went on. In a very curious book, written by Joseph Moxon, a mathematical-instrument maker, who also applied his mechanical knowledge to the art of letter-cutting, we are informed that, in 1686, "the number of founders and printers were grown very many, insomuch that, for the more easy management of typography, the operators had found it necessary to divide it into the several trades of the master-printer, the letter-cutter, the letter-caster, the letter-dresser, the compositor, the corrector, the pressman, the ink-maker, besides several other trades which they take into their assistance, as the smith, the joiner, &c." Such a division of labour indicates the natural progress of an art towards perfection, and is indeed in itself a cause of that perfection. Moxon says that letter-cutting was a handy-work at that time, kept so concealed among the artificers of it, that he could not learn any one had taught it any other. Moxon himself, however, laid down mathematical rules for the formation of letters, but he does not appear to have attempted any improvement in their shape. In the reign of Anne we imported most of our type from Holland, where the letter-founders had succeeded in producing much more beautiful characters. At length, however, in 1720, William Caslon, an engraver of gun-locks and barrels, having the credit of being a most ingenious artist, was employed by the 'Society for Promoting Christian Knowledge' to cut the punches for a fount of Arabic. His success led him to enter into the business of a letter-founder, in which undertaking he was assisted by Bowyer, the celebrated printer. In a very few years Caslon had rendered the English types superior to any in Europe; when the importation of foreign types ceased, and the founts of this ingenious founder became in demand on the Continent. The Caslon foundry is still continued by a descendant of the same name, with undiminished reputation.

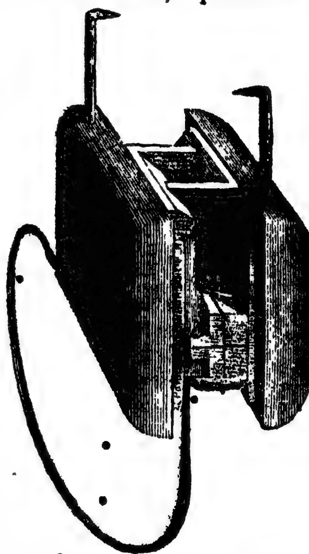
The different sizes of types which are cast in this country are very considerable, varying from the smallest called diamond, of which 205 lines are contained in a foot, to those large letters which we see employed in placards, of which some single letters are three or even four inches high. The type in which the 'Penny Magazine' is chiefly printed,—that is, the type which the reader is now perusing,—is called Long Primer, and this type stands mid-way between the largest and the smallest ever used in printing books. We give a list of the names of these letters, with a scale which expresses their proportions, in the number of lines which each occupies in a foot:—

Double Pica	41½	Bourgeois	102½
Paragon	44½	Brevier	112½
Great Primer	51¼	Minion	128
English	64	Nonpareil	143
Pica	71½	Pearl	178
Small Pica	83	Diamond	205
Long Primer	89		

It is considered that the early printers and type-founders were very imperfectly acquainted with the proper composition of metal to be used. Lead, as being the most flexible metal, was principally employed; but then it was too soft for durability, and a portion of iron was consequently added. Regulus of antimony is now added to the lead, instead of iron. The smallest-sized types requiring the hardest metal, the alloy for these is twenty-five parts of the regulus of antimony to seventy-five parts of lead; the proportions are varied for the larger sizes, so that in some only fifteen parts of antimony are used to eighty-five of lead.

We have stated that the early printers were their own letter-founders. In their case they united the two trades, because the division of labour was imperfect. When an art becomes very much advanced, so as to allow one individual to employ his capital upon the largest scale, we sometimes find several distinct branches of trade carried on under the same roof. Thus in some large cotton factories we have the spinning and weaving processes united in the same establishment. It is not that the division of labour is not perfect in each department, but that there are commercial advantages which result from uniting two or more branches of one business. In this way, we find the business of type-founding carried on at the present day in one of the largest printing establishments in London,—that of Mr. Clowes, in Duke Street, Stamford Street,—the office where the 'Penny Magazine' and 'Cyclopædia' are printed. As we shall have to describe the subsequent processes of printing as practised in this office, it may be convenient to describe the practice of type-founding as it may be here seen.

Upon entering the Foundry, the superintendent, or overseer, will exhibit to the visitor a Punch and a Matrix. The punch is of hardened steel, and exhibits upon its face a single letter, formed by hammering down the hollows, and filing up the edges, when the metal was in a softened state. With this tool, an impression is struck into a piece of copper, about one inch and a quarter long, one-eighth of an inch deep, and wide in proportion to the size of the type to be cast. This is the matrix; which, after the die is sunk, is filed up to ensure the cast taken from it to be of the requisite depth, which process is called justifying. It will be desirable that the visitor should also inspect the Mould. This is a most ingenious little instrument, represented in the following wood-cut:



The mould is composed of two parts. The external surface is of wood; the internal of steel. At the top, as will be seen by the cut, is a shelving orifice, into which the metal is poured. The space within is as true as if it had been hollowed out of a single piece of steel; but nevertheless it is formed by the intimate union of the two parts of the mould, each part forming two of the four sides of the letter. It is not a matter of difficult adjustment to bring these sides together; it is the operation only of an instant. At the bottom of the mould, immediately under the orifice, is the matrix. This is held in its place by a metal spring, represented at the lower part of the cut; and every letter that is cast can only be loosened from the matrix by removing the pressure of the spring. In the larger cut at the end of this article, there is a representation of three furnaces. At the first, which is unoccupied, may be seen the little table at which the founder works, and the pot out of which he dips the heated metal with a very small ladle. At the second furnace the workman is shown at the moment after he has poured the metal into the mould. And at the third, the other workman is represented in the act of separating the two parts of the mould, and picking out the letter from the lower half, with the hook shown at the top edge of the other half.

Having made himself acquainted with the construction of the mould, and the mode by which the matrix is adjusted, the visitor proceeds into the foundry. His attention is naturally drawn to the extraordinary movement with which the founder performs the operation of *casting*. Having poured in the metal with his right hand, and returned the ladle to the melting-pot, he throws up his left hand, which holds the mould, above his head, with a sudden jerk, supporting it with his right hand. It is this movement which forces the metal into all the interstices of the matrix; and without the movement the metal, especially in the smaller types, would not reach the bottom of the mould, for it could not force out the air by its specific gravity alone. But the observer will be equally astonished by the precision, as well as the rapidity of the whole operation, of pouring in the metal, throwing up the mould, unclosing it, and removing the pressure of the spring, picking out the cast letter, closing the mould again, and re-applying the spring to be ready for repeating the whole act. All these operations do not occupy the eighth of a minute, for the average number of letters cast in an hour is five hundred. We should observe, that a considerable piece of metal remains attached to the end of the type when it is turned out of the mould; also, that the mould is so constructed that it forms what is called a nick, or nicks, on the lower edge of the letter, by which the printer at once sees the right way to place it without looking at the face.

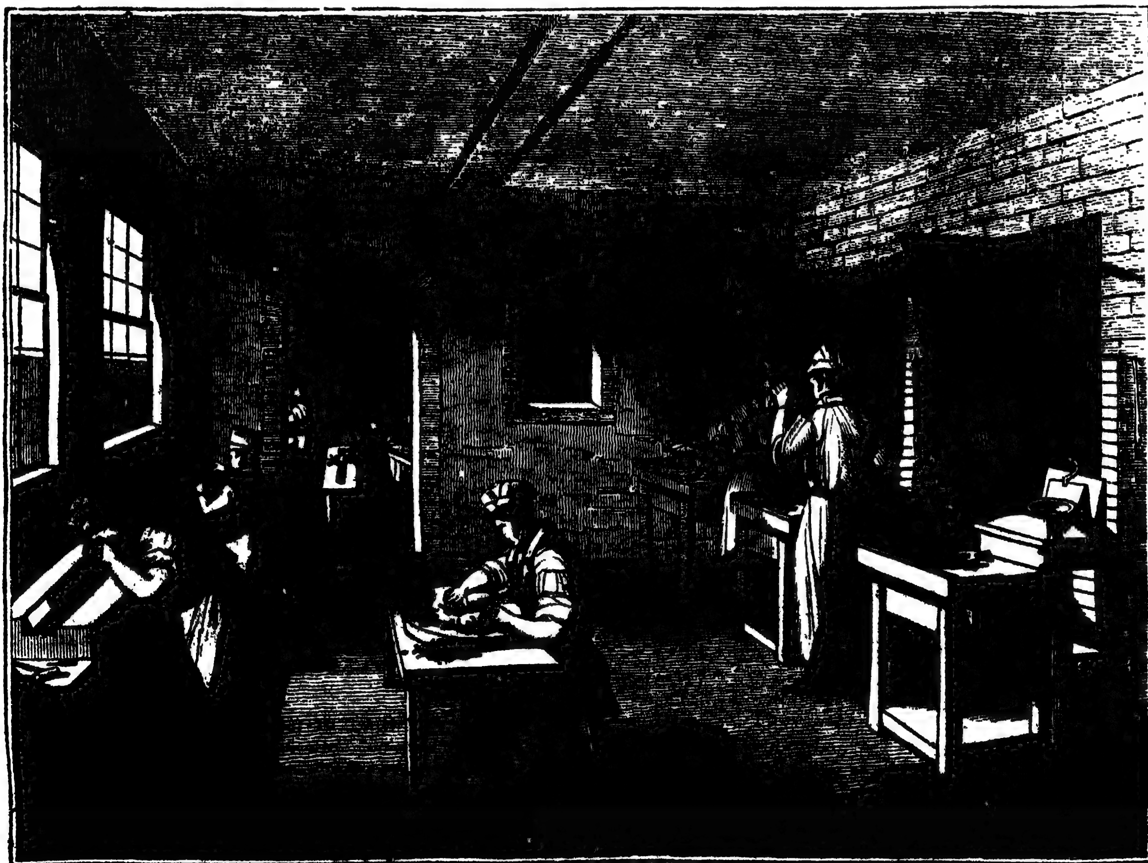
From the table of the caster the heap of types cast is from time to time removed by a boy to another table. It is his business to break off the superfluous metal; and this he does with such rapidity that the mode in which he operates can scarcely be followed by the eye. Some boys have been known to break off 5000 in an hour; the average number is 2000. This rapidity is the more remarkable, as the boy must seize the type, not upon the flat surface, but upon its edges, or he would otherwise break or bend it.

From the *breaking-off boy* the types are removed to the *rubber*. In the wood-cut this workman is represented seated in the centre. A round grit-stone is before him, upon which is a heap of types. The fore and middle fingers of his right hand are armed with a piece of tarred leather; and he passes each side (not the edges) of the type smartly over the stone, turning it, of course, in the movement. This, again, is an example of wonderful rapidity; 2000 types are thus rubbed in an hour.

From the rubber the heap is conveyed to a boy whose business is to set up the types in lines, in a long shallow frame. The face of each must be uppermost, and the nicks outward. The rate at which this boy works is the same as the rubber.

When the types are once set up in lines, they are never again deranged till they are given out to be used by the printer. The long frame, filled with a single line of type, is removed to the *dresser*. By the application of other frames, he is enabled to dress, or polish them, on each edge; and, turning them with the face downwards, to channel-cut with a plane a groove in the bottom, so that they will stand steadily. It will be at once understood how necessary it is that every letter should be perfectly square and true, when it is considered that if they were not of uniform height the impression could not be even; and that if there were the least deviation from a regular form, it would be quite impossible that, when 200,000 single letters are combined, as in one side of the 'Times' newspaper, they should hold together as they do, when wedged up, as securely as if that side were composed of one solid piece of metal.

Each letter being tied up in lines of convenient length, the proportionate numbers of each variety, small letters, points, capitals, small capitals, and figures, are selected; and the fount is ready for delivery to the printer.



[View of the Type-Foundry.]

⁎ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields
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OF THE

Society for the Diffusion of Useful Knowledge.

102.] PUBLISHED EVERY SATURDAY. [NOVEMBER 2, 1833.

A ROMAN HORSE-RACE.



[Horses preparing to Start.]

HORSE-RACING forms one of the principal amusements of the carneval at Rome. The common people, perhaps, do not take so much delight in any other pastime of that gay season. A Roman horse-race is, however, a very different thing from an English one. Instead of a contest in which the skill and boldness of man are as much to be admired as the speed and vigour of the animal he rides, the Roman course presents nothing but the horse which runs without any rider. It is not, however, left entirely to its own spirit and emulation; if it were, the sight would be more interesting, as showing the natural character of the animal: but it is started by noise, and goaded on by contrivances quite as artificial as the whip and spur of our jockeys.

The barberi, (barbs—so called, perhaps, because the first horses thus employed were of the Barbary breed,) when brought to the starting-post, are gaily ornamented in the front of the head, and sometimes down the neck,

with plumes of peacock and other feathers. To a girth which goes round the body of each, are attached several loose straps which have at their ends small balls of lead from which issue sharp steel points,—the motion imparted to these straps by the animals' running keeps up a continual spurring on their flanks and bellies. Sheets of thin tin, stiff paper or some other substance that will make a rustling or rattling noise when agitated, are also fastened on the horses' backs.

The last mentioned articles serve to startle and alarm them, as if the prickly leaden balls were not excitement enough. The rearing, kicking, pawing, and snorting they make, when thus equipped, may be easily conceived. The most interesting part of the sight is that represented in our engraving, when they are just about to start. A very strong rope, secured by a machine on each side, is drawn across the street of the Corso, and up to this each man tries to bring his horse, holding it in, with all his might, by the head. The Trasteverini, and many of the peasantry in the neighbourhood of Rome, are remarkably fine, muscular men; and as they generally go to work with their arms and necks bare, and as they have frequently to maintain a struggle of downright strength with their excited horses, the action of their limbs and muscles, and other circumstances, offer a useful exhibition to the sculptor or painter. Though there are no riders, human life is more endangered in these than in our races. Sometimes the horse masters his groom, and breaks away before the Corso is cleared of people, in which and in several other cases, serious accidents are almost sure to happen.

When matters are ready, a troop of dragoons set off from the other end of the Corso, and go at full gallop towards the starting-post, clearing the way: these soldiers then retire, and soon after an officer blows a trumpet from a balcony erected near to the spot whence the race is to begin. At the sound of the trumpet, the strong rope stretched across the street drops, the grooms let go their hold, and off start the horses like arrows from a bow. The harder they run, the more they are pricked. Some of them have been known to be so wise as to stop, when the motion of the leaden balls, of course, would cease; but generally they run on at mad career, and *occasionally* show emulation and spite, by catching and biting at each other.

The judge of the race is no less a personage than the Governor of Rome, who stands at a window in the palace of Venice, at which building is the goal or winning-post, or, as the Romans call it, "la ripresa de' barberi." A little beyond this palace the street is shut in with a screen of strong canvas, through which the horses not unfrequently dash, though to their eyes it must look almost like a wall. The prize given to the master of the winning horse is merely an ornamental flag, and a piece of embroidered stuff.

During the first six days of the carneval, which at Rome is limited to eight days, matches of mares, barbs, and other horses, are run alternately; but during the two last days these different classes of animals run all together, and thus naturally add to the riot, danger, and confusion of the exhibition.

Some of the barberi brought up to the rope, though small, being mostly rather under than over fourteen hands, are clean-legged, well-formed, compact, and spirited creatures, giving evidence of good blood; but taking the Roman racers generally, we doubt, were they mounted, whether they would not be beaten in most of our pony races.

Though betting, which gives such a perilous interest to our race-course, is by no means common, and the prize contended for so little worth, nothing can exceed the eagerness of the excitable Italians on these occasions. During the heat, the spectators honour with deafening "bravos" the horse that runs well, and hiss and hoot with almost equal noise all such as lag behind.

The Maltese have another very curious method of horse-racing. The horses are indeed mounted, but they are not furnished with saddle, bridle, or any things of the sort; the riders sit on the bare back, and have no reins or any thing else in their hands except a small pointed instrument, not unlike a cobbler's awl; with which they prick on their steeds.

These races are held on a grand festival in the month of June, at Città Vecchia in the interior of the island. The horses are generally barbs, imported from the neighbouring coast of Africa,—small, good tempered, and certainly not swift. To these characteristics of the animals which facilitate such a mode of equitation, we must add the important circumstance, that where the run or the great effort is made they go up hill.

With an animal of any thing like the velocity and springy action of an English race-horse, it would be impossible to do without what the author of an excellent article on the "Turf," in No. xcviii. of the 'Quarterly Review,' calls "the fulcrum of the stirrups;" and it would only be a *little* less impossible to stop him without bit or bridle. Indeed, even with such steeds as some of them have, we fancy, if the Maltese would reverse the case, and make the grand run down hill, instead of up, that not many of them would keep their seats. It would excite the derision of the Buckles and Chifneys, and other heroes of our turf, to see a naked-legged, naked-armed, red-sashed, slovenly set of fellows, rolling about on their ponies like so many Bacchuses on wine barrels, flourishing their awls, and bawling out in the most indecorous manner; but, notwithstanding this, the Maltese races certainly offer a novel and amusing scene to the stranger.

EDUCATION FOR THE POOR.

THE different methods in which children are educated in parish-workhouses, and the different results of a bad and a good system, are strikingly shown in some evidence lately published by the Poor-Law Commissioners. We print the details of two witnesses, exhibiting the opposing practices in parallel columns:—

BAD.

EVIDENCE OF MR. CROOK, CLERK OF ST. CLEMENT'S DANES.

WHAT sort of education have you for the children of your parish? — The education which they receive, judging from the effects, is of little or no use, for I am sorry to say that the children turn out very badly. We have great difficulty in getting rid of them; the boys especially. There is a large proportion of indifferent characters amongst them.

Does any person of education take any part in the education of the workhouse children?—Their education has been in the hands of a man who has been a sailor and a watchman. The boys under his management were so disorderly that in vexation he attempted to hang himself.

Was this, or the other persons who have had the education of the children, characterized by superior acquirements to those commonly possessed by watchmen and sailors, or persons of the

GOOD.

EVIDENCE OF MR. HUISH, ASSISTANT OVERSEER OF ST. GEORGE'S, SOUTHWARK.

WE have about seventy boys weekly in our workhouse school. There have been nearly the same number during the time I have been in office. They have always been very fairly educated. During the last twelve years they have been fortunate in having had very good masters; good moral men as well as good teachers.

How have these boys turned out when apprenticed or got out to work?—The boys who have been apprenticed have on the whole turned out very good boys.

How many per cent. of their masters have received the second premium?—I think about eighty per cent. But the casualties of death, removals, and other causes than the misconduct of the boys, may account for the second premium not being received in a large proportion of the remaining cases.

How many of these boys have you known return to the

BAD.

labouring classes; or were they distinguished by their superior moral habits?—No, they certainly had no superior acquirements; and as to good moral habits, they were not distinguished; quite the contrary. One master was employed in keeping an account of the beer sent into the workhouse by the publicans; and it was found that he had not only got liquors supplied to himself by various publicans, and charged an equivalent amount of beer to the parish, but had received money regularly, and charged it under the head of beer supplied to the workhouse. It was believed that his scholars had been made agents in the negotiation of these matters. This occurred some years ago. But I have constant reason to wish that more care were taken of the moral and intellectual education of the children. If Government could only see what the course of life of these unfortunate children is, what plagues they are made, and how poor is their education, I think little time would be lost in getting an education which would have some influence on their habits and conduct in life.

GOOD.

parish as bad characters?—Since I have been in office I only remember two cases.

How many have returned from such causes as failure of work or want of competency, or other causes than those not deemed bad, or bad conduct?—I do not know of any other instances whatever, beyond those I have mentioned, where the boys sent out during the last twelve years have returned upon the parish.

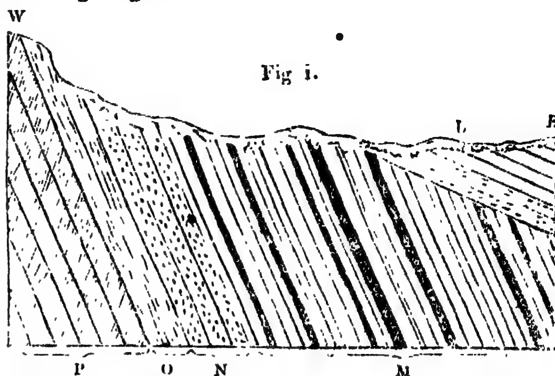
Can you state from your observation that this result of the good general conduct of the workhouse boys has been the effect of their more careful education?—I have no doubt whatever that the great care bestowed on their education, and the general attention paid by the minister of our parish, and a number of well-disposed persons, to their moral and religious conduct, has been productive of these effects. The boys in the workhouse are frequently visited by respectable people, who pay attention to their behaviour and treat them with kindness. I am quite sure that with such care as may easily be given, the children may be made to turn out well; where, had no care been given, they would in the ninety-nine cases have turned out bad.

MINERAL KINGDOM.—Section 15.

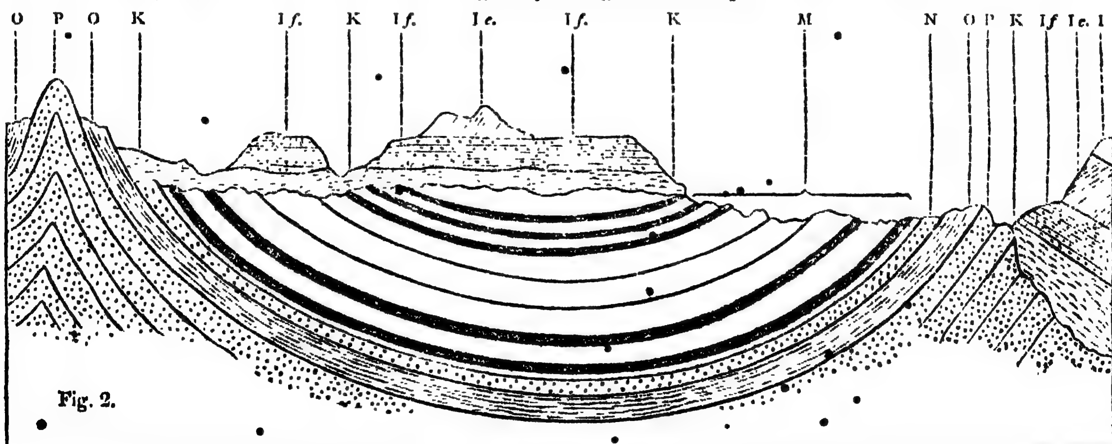
COAL.

Geological Situation.—(Continued.)

We have said that the coal-measures consist of a series of beds of sandstones, shales, clays and coal, lying one above another in repeated alternations; but it must not be supposed that they lie horizontally as they are represented in the diagram in No. 51, already so often referred to. They must, no doubt, have been originally deposited, in most cases, on a level or nearly level bottom; but with very few exceptions indeed, the coal-measures have been thrown out of the horizontal line into highly inclined positions, and frequently broken up and thrown about in the most extraordinary manner, by a great force, from the interior of the earth. One of the most simple cases of disturbance is represented by the following diagram:—



This is an ideal section, across a coal-field,—that is to say, if we made a deep perpendicular cut of the ground, and saw a wall exposed like a vertical cliff on the sea shore, the strata would exhibit the appearance here represented, in many cases. We have, on the west, the old red sandstone P, covered by the carboniferous limestone O, which is succeeded by the mill-stone grit, N; then come the coal-measures, M; and, proceeding eastward, we find these dipping under the sandstone and magnesian limestone, L, which cover them in what is called unconformable stratification. The coal-measures must have been thrown out of their horizontal position; and the ends of the strata formed the bottom of the sea, while the materials of the sandstone and magnesian limestone were deposited upon them in horizontal stratification. It is not very often the case that the coal-measures are so much inclined as in this diagram; they more usually dip, as it is termed, at a less angle: but it is a very frequent occurrence to find them forming a great trough or basin, rising all round from a central point, the sides of the basin being formed by the inferior sandstone or limestone, and the middle being filled up by strata superior to the coal-measures. The following diagram will explain what we mean:—



The above letters correspond with the Section in No. 51,—19th of January, 1832.

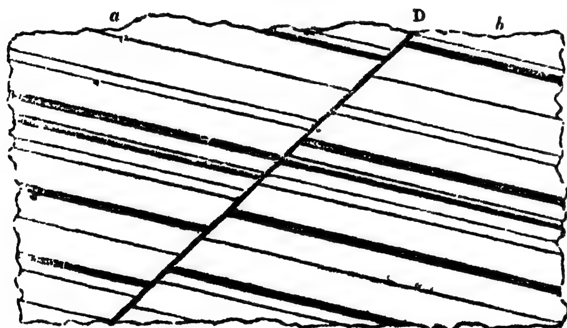
I. Upper oolite, or Bath stone.
I e. Inferior oolite, a coarse shelly limestone.
I f. Thin beds of limestone (lias) and slaty clay.
K. Red marly sandstone.
M. The coal-measures—with five principal seams of coal.
N. The millstone grit.
O. The carboniferous limestone.
P. The old red sandstone.

This is not an ideal section, but a true representation of the strata in a part of the Bristol coal-field, the section being from the Mendip Hills, above Axbridge, through Dundry Hill to Fog Hill, north-west of Bath, in a direction between south-west and north-east, and extending about twenty miles. We do not of course mean to say that, if a vertical section were made along the whole line, the coal-measures would exhibit the

regular curves here shown; they would, doubtless, appear much disturbed and interrupted: the diagram gives only the general character of a country actually surveyed, without attention to proportions, which could not of course be given except on a long line. Here we find the summit of the Mendip Hills P, composed of the old red sandstone rising up in inclined stratification and flanked on both sides by the carboniferous limestone O. In the south part of the coal-field, the beds dip to the north; but in the northern part they dip in the opposite direction; and proceeding northwards, the millstone grit N, is seen rising from under them, and from beneath that the limestone and old red sandstone again appear in succession. It is evident that, subsequent to the deposition of the old red sandstone and coal-measures, they were upheaved by a force from below, acting on several points at the same time, which turned up the strata into their present basin-shaped form. This section exhibits also another geological phenomenon of frequent occurrence, of the same kind as is seen in the ideal Section, Fig. 1; it shows that the disturbance we speak of took place prior to the deposition of the newer secondary strata K, I *f*, I *e*, for these strata lie upon the tilted-up ends of the coal-measures. It affords besides proofs of great changes on the surface after the formation of these newer secondary strata, for the parts now detached were no doubt once continuous. This interruption to the continuity was probably occasioned by the combined action of earthquakes and subsequent floods, which have scooped out the land, leaving the hills and valleys that now diversify the surface of the country. Very frequently such denudations have taken place in parts of the country, as for instance, in the Newcastle coal-fields, where the coal measures come near to the surface, and thus great tracts of coal have been swept away. It is to this cause that we assign many cases of the breaking off of seams of coal, in a country where they have been expected to be found continuous.

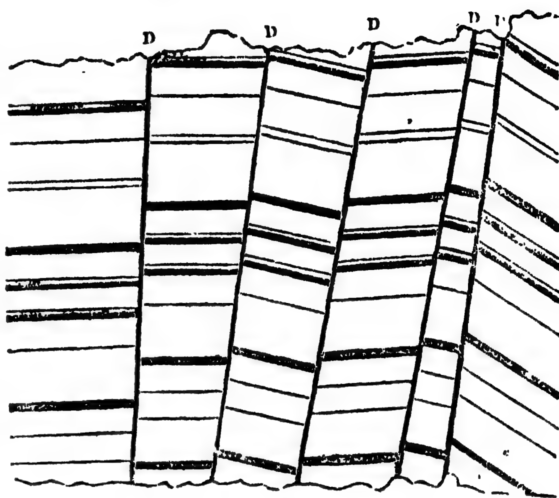
The coal-measures exhibit other proofs of having been subjected to great disturbances, after they had been consolidated, which will be better understood by the following diagram:—

Fig. 3.



The strata here, in place of continuing uninterruptedly, are suddenly broken off by what is termed a FAULT or DIKE D; and, on passing through this dike, it is found that the same beds occupy different levels on opposite sides of it, the corresponding parts being thrown out of the former plane, sometimes only a few inches, at others several fathoms, and even as much as five hundred feet, so that the same seam of coal, which on one side of the dike is perhaps not more than twenty feet from the surface, may be sunk to the depth of five hundred feet on the other side of it. It is impossible to say whether it was the portion *a* which was depressed, or *b* which was upheaved: the one or the other would have produced the same effect. Sometimes several such dikes occur within a very short distance, as in the following diagram, which is a section of the coal-measures in Jarrow colliery in the county of Durham, where there are five different dikes D, all producing changes in the levels of the strata on each side of them.

Fig. 4.



These dikes are clefts or fissures which often extend many miles; they penetrate in most cases to an unknown depth, and usually in a vertical direction. They are sometimes mere rents, the two masses of strata on each side keeping in contact during the motion by which the continuity of the stratification was broken; at other times, and this is the more common case, they are filled with fragments of the disrupted strata imbedded in clay, which has subsequently filtered into them. In a part of the Newcastle coal-field, in Montagu colliery, there is a dike which is twenty-two yards wide.

The coal-measures are also disturbed by the passage of vast veins of trap, basalt, or whinstone, which have been ejected from the interior of the earth like lava, filling up vents either previously existing, or caused by the same force which threw the melted stone to the surface. They are also called dikes, with the addition of the name of the stone, whin dikes by miners, and basaltic dikes by geologists, and produce the same effect of changing the planes of stratification on each side of them. They are very common in the coal-fields of Northumberland, Staffordshire, and Scotland; and it is very probable that even where they do not appear, they have been the cause of the disturbances to which coal-fields are so peculiarly liable. A remarkable circumstance often attends them in the change which takes place in the character of the stone or coal in contact with them, the coal for a considerable distance inward being converted into a substance in appearance and properties exactly resembling coke, and the sandstone and shales into compact flints and jaspers; evident proofs of the basalt having been injected among the strata in a highly heated state.

Dikes of all sorts occasion vast difficulties and expense in mining, not only on account of their interrupting the regularity of the seams of coal, but because they very often are conduits for water, and when pierced, a flood drowns the mine, and sometimes so suddenly that the miners have no time to escape, and thus many lives have been lost. If this total destruction of the mine does not take place, they cause such a constant flow of water that it can only be drawn off by powerful steam-engines at the surface. On the other hand, faults are often a source of great benefit, for when filled with stiff clay they prevent the access of water from the other side, and by means of them a valuable seam of coal may be thrown up within reach of working, which would otherwise have been lost.

[In our next Section, we shall state the opinions generally entertained by geologists as to the probable origin of coal.]

OLD TRAVELLERS.—WILLIAM DAMPIER.—No. 2.

Shortly after Christmas, 1679, the buccaneers, commanded by Captains Sawkins, Coxon, and Sharp, and accompanied by Dampier, Wafer, and several other men of considerable acquirements, and (from all that appears) of decent conduct and honourable sentiments on all subjects unconnected "with the service," set out on a long contemplated and important expedition against the Spaniards at Portobel and on the isthmus of Darien. We can only hastily abridge their adventures, which, except inasmuch as they went to extend geographical discovery and our knowledge of the globe, and are connected with such individuals as Dampier and Wafer, offer little that we could recommend for our reader's admiration or improvement. The pervading moral—that money easily acquired is still more rapidly spent, and that a life of debauchery, plunder, and violence leads to a violent death, or to misery,—is too obvious to be dwelt upon.

Having accomplished this expedition against Portobel, the buccaneers resolved "to march by land over the isthmus of Darien, upon some new adventures in the South Seas,"—a daring attempt; but of which a successful example had been set them a few years before, by the bold, but cruel Morgan.

They accordingly landed to the number of about three hundred and fifty men; and after nine days of intolerable fatigue, arrived at the Spanish town of Santa Maria, which they attacked and took. They then proceeded to the shore of the Pacific Ocean, and having no vessels but Indian canoes and periagos, they fearlessly proceeded with these until they captured some Spanish traders.

They were soon in sight of Panama, but durst not attack that city. In an unsuccessful attempt they made on Puebla Nova, they lost a good number of men and Sawkins, who had been elected commander in-chief. Changing their course, they stood away to the southward for the coast of Peru, where they cruized for some months, and plundered one small town. They passed their Christmas at the island of Juan Fernandez, which was the farthest of their course to the southward. While there, being dissatisfied with Sharp, who had succeeded Sawkins in the chief command, they displaced him and advanced Watling. Shortly after this, they were repulsed with dreadful loss before the town of Arica, and their new commander-in chief was among the number of the slain.

Dissensions now broke out among them. One party would re-elect Sharp as commander-in-chief, whilst another, thinking him deficient in courage and enterprise, would not sail under his orders. Dampier, Wafer, and some of the best of the men, were of the party adverse to Sharp. At last they agreed to part company. Sharp's faction, as being the more numerous, kept the ship, and remained in the South Seas; and Dampier's took the long boat and the canoes, and made for the isthmus of Darien, which they determined to recross.

"We were," says our traveller, "in number, forty-four white men, who bore arms, a Spanish Indian, who bore arms also, and two Moskito Indians, who always bear arms among the privateers, and are much valued by them for striking fish, and turtle or tortoise, and manatee or sea-cow; and we had five slaves taken in the South Seas who fell to our share."

As they approached the isthmus, they found that the Spaniards were on the look out for them, having three large ships of war cruizing off the coast, and some hundreds of soldiers at different posts along shore. Though several times in extreme danger, the buccaneers contrived to elude their enraged enemies, and to land safely in a small creek in the Bay of Panama, a little to the west of Cape St. Lorenzo. Having sunk their boats, that no traces might be seen of them, they began their march across the difficult country, directing their course north-east by their pocket compasses. In their journey they had to avoid the Spaniards, and such wild Indian tribes as were friendly to that nation. Fortunately for them, the oppression and cruelty of the Spaniards had not left many such friends, and the majority of the poor natives were well disposed towards the English sailors.

The difficulties they had to encounter were, however, very great, the isthmus chiefly consisting of pathless forests, deep rivers, torrents and mountains of the rudest description. As they advanced, guides became indispensable, and these could not always be procured without difficulty. On one occasion an old Indian resisted all the temptations of beads, money, hatchets, and long knives; "nothing," says Dampier, "would work on him, till one of our men took a sky-colowred petticoat out of his bag, and put it on his wife, who was so much pleased with the present, that she immediately began to chatter to her husband, and soon brought him into a better humour."

During the greater part of the journey, the rain descended in torrents, rendering the rivers and even the brooks impassable, and frequently obliging them to stop. At one of their halts made to dry their clothes, fire-arms, and ammunition, Dampier informs us that "the chyrurgeon, Mr. Wafer, came to a sad disaster; being drying his powder, a careless fellow passed by with his pipe lighted, and set fire to his powder, which blew up, and scorched his knee, and reduced him to that condition that he was not able to march; wherefore we allowed him a slave to carry his things, being all of us the more concerned at his accident, because liable ourselves every moment to misfortune, and none to look after us but him."

The poor surgeon, who was almost as good an observer, and as happy in describing what he saw, as Dampier himself, contrived to keep up with the party for some four or five days longer; but then the slaves ran away, and the negro appointed to attend on him absconded with his medicine chest, clothes, &c. We may here use his own words: "And so not being able to trudge it farther through rivers and woods, I took leave of my companions, and set up my rest among the Darien Indians. And there staid with me one Mr. Richard Jopson, who had served an apprenticeship to a druggist in London; he was an ingenious man, and a good scholar; he had with him a Greek testament, which he frequently read, and would translate *extempore* into English to such of the company as were disposed to hear him."

To this accidental detention of Lionel Wafer, we are indebted for one of the most interesting accounts of savage life that have ever been written—for one of the most amusing and delightful of books.

Besides the accomplished Richard Jopson, who could read Greek, three other sailors, incapable of continuing the journey, remained with the surgeon. As he had no means of alleviating the anguish of his wound, he put himself in the hands of the natives, who undertook his cure, and effected it in twenty days, by daily applying "some herbs which they first chewed in their mouths to the consistency of a paste, and putting it on a plantain leaf, and laying it upon the sore."

In other respects, however, the Indians were not so kind; only throwing them unripe plantains for food, "as you would bones to a dog." This incivility increased as time went on, without the return of the Indians of their tribe, who had gone with the main body of the buccaneers and Dampier as guides. They suspected their friends had met with foul play; and at length, as there was still no news of them, the savages determined to sacrifice their guests. One morning they prepared a great pile of wood, and told Wafer that he

and his companions must expect to be burned on it when the sun went down, if the guides were not returned.

In this horrid suspense, when they thought their doom inevitable, Lacenta, the king or chief of the Indians, happened to pass that way, and dissuaded the enraged people from their cruel purpose. The Englishmen were then sent, under the escort of two of the Indians, towards the northern coast of the isthmus, where they might find their comrades, or obtain some means of leaving the country. For three days they marched through incessant rains accompanied by terrific lightning: the country was swamped: they had nothing to eat but a little dry maize, and when this was expended on the third day, the Indians ran off and abandoned them in the wilderness. They had now no food; but on the fifth day they found some maccaw-trees, the berries of which afforded a trifling nourishment. Their only guide was a pocket compass, and they lost their way among forests, mountains, rivers, floods, and torrents, the rain never ceasing. After eight days of wandering, being completely bewildered, they concluded it best to follow the track of a peccary, hoping it might lead them to some plantation or potato field, which the wild hogs frequent for food. The track, indeed, led them to an old plantation, in sight of a new one, which proved to be close to the Indian village where they had been threatened with burning, and whence they had set out so many days before.

On reaching the huts of the Indians, Wafer swooned from long fasting and fatigue; but the disposition of those people had undergone a very advantageous change. Their brethren, the guides, had not only returned safely from the coast to which they had accompanied the buccaneers, but were delighted with the kind treatment and handsome presents they had received for their services. Accordingly they treated Wafer and his companions with extreme kindness, entertained them hospitably for seven days, and then gave them a proper escort and provisions, that they might reach the northern coast.

After marching for six days they arrived at the residence of the merciful Lacenta. This chief insisted that they should not proceed further during the rainy season, which still continued; and as, after such long delays, they had little hope of finding their comrades on the coast, the Englishmen the more willingly resigned themselves to a residence among savages.

In a short time the surgical ability of Lionel Wafer exalted him to honours. One of the chief's wives fell sick, and bleeding was prescribed: Wafer thus describes the Darien Indian mode of performing the operation:—

"The patient is seated on a stone in the river, and one with a small bow shoots little arrows into the naked body of the patient, up and down, shooting them as fast as he can, and not missing any part; but the arrows are gagged, so that they penetrate no further than we generally thrust our lancets."

Wafer volunteered to bleed the lady without inflicting so much torment, and Lacenta consented that he should perform the important operation; but, after the incision made by the lancet, when that chief saw the blood spout out in a stream, instead of falling drop by drop, as it did in their method, he laid hold of his lance, and swore by his tooth, (the most solemn of their oaths,) that if his wife did otherwise than well, he would have the doctor's heart's blood.

It was soon seen, however, that the stranger's mode of bleeding was every way better than their own, and when, after her venesection and a little repose, his wife had recovered from her fever, Lacenta came, and before all his train, bowed, and kissed the surgeon's hand. "Then," says Lionel, "the rest came thick about me, and some kissed my hand, others my knee, and some my foot; after which I was taken up in a hammock and carried on men's shoulders, Lacenta himself making a speech in my praise, and commending me as much superior to any of their doctors. And thus, afterwards, I was carried about from plantation to plantation, and lived in great splendour and repute, administering both physic and phlebotomy to those that wanted." Most luckily for Wafer, he had a case of instruments and a few medicaments wrapped up in an oil cloth, and in his pocket, when the Negro decamped with the rest of his effects. He continued to live for several months with these poor Indians, who, he says, almost adored him. He frequently went out hunting with the chief, who became so much attached to him, that he wished to keep him with him all the days of his life. The manner in which the surgeon contrived to escape from this affectionate savage is as characteristic as the rest of his adventures. These Indians had no good dogs; the breed they had was so poor and spiritless, that the peccaries would often keep them in play a whole day. Sometimes the dogs would not run either by sight or scent—they were, in short, sad curs. Wafer had frequent opportunities of remarking this, and of dwelling on the surpassing excellence of English hounds. At length he proposed, that, with the chief's kind permission, he would go to England, and *soon* return with a good supply of his country's dogs. As the chase was not a mere amusement, as among us, but Lacenta's principal means of subsistence, this was offering a great temptation. "He demurred, however," says Wafer, "awhile, but at length he swore by his tooth, laying his finger on it, that I should have my liberty, and for my sake, the other four with me, provided I would promise and swear by my tooth, that I would return and marry among them, for he had made me a promise of his daughter in marriage."

Wafer was forced to do what was required of him. An Indian escort was then granted of seven stout men, and four women, to carry the provisions and clothes. The surgeon's wardrobe was sadly reduced, consisting only of "a linen frock and a pair of breeches." "These," says Lionel, "I saved to cover my nakedness if ever I should come among Christians again, for at this time I went naked as the salvages, and was painted by their women."

After a most fatiguing journey, Wafer and his comrades reached the Atlantic shores of the isthmus of Darien. But there were no English or friendly ships on the coast, and they found themselves still obliged to abide among the Indians. On this sad occasion, seeing no means of quitting the wild country, Wafer showed some credulity and folly in consulting one of their conjurors. At day-break of the tenth day after their arrival on the coast, the anxious Englishmen heard a gun at sea, and presently another gun was fired. The Indians, well knowing these buccaneer signals, presently went off in their canoes, taking Wafer and his friends with them. They found, behind a small island called La Sound's Key, two vessels manned by Englishmen, that had come to anchor during the night. In one of these ships was Dampier, with many of their old companions in the South Sea and in the disastrous journey across part of the isthmus. The vessels, indeed, had come on purpose to look out for those five men who had been left behind.

The four seamen, not having been honoured like the surgeon, were probably not disguised by paint and Indian ornaments; they were presently recognized and heartily welcomed by their old shipmates. "But I," says Wafer, "sat awhile, cringing upon my hams among the Indians, after their fashion, painted as they were, and all naked but only about the waist, and with my nose-piece hanging over my mouth. I was willing to try if they knew me in this disguise, and 'twas the better part of an hour, before one, looking more narrowly upon me, cried out, 'Why! here's our doctor!' and immediately they all congratulated my arrival among them."

Our adventurer, Dampier, having his old associate,

Lionel Wafer, with him the greater part of the time, remained with the buccaneers, cruising in the South Seas, off the Spanish main, until the summer of 1682. During this time he obtained, by diligent observation, a most extensive knowledge of the coasts of the American continent, and he still kept a journal of all that was interesting in his profession, and novel or curious in natural history. On crossing the isthmus of Darien, his greatest solicitude appears to have been for the preservation of the journals he had made up to that period. "Foreseeing," he says, "a necessity of wading through rivers frequently in our land march, I took care, before I left my ship, to provide myself a large joint of bamboo, which I stopped at both ends, closing it with wax, so as to keep out any water. In this I preserved my journal and other writings from being wet, though I was often forced to swim."

From these journals, written during the leisure hours which the majority of his comrades passed in drinking, gambling, and quarrelling, and from his having always paid such attention to their preservation, Dampier was in after years enabled to draw up a work which has excited the admiration of the world.

In July, 1682, our traveller retired to Virginia, which was by this time an English settlement of importance. His love of wandering and adventure soon, however, repossessed him; and in August, 1683, joining another buccaneer expedition, in which Lionel Wafer was engaged as surgeon, he sailed from Virginia for the South Seas. This time he did not cross the isthmus of Darien, but, stretching along the whole of South America, he doubled Cape Horn, and so entered the South Seas. On the 23rd of March, 1684, he was again at the island of Juan Fernandez, in speaking of which place, he introduces that most interesting anecdote of William, a Mosquito Indian, who had been left for more than three years on that uninhabited island. The reader will find the anecdote in No. 30 of the 'Penny Magazine.'

[To be continued.]

Opposition of Ignorance to the use of Printing.—In the 'Typographical Antiquities' of Ames and Herbert, it is stated, that the first book printed on paper manufactured in England, came out in 1495 or 1496, from the press of Wynkin de Worde. Shakspeare—whose chronology is not to be trusted—makes Jack Cade, in the reign of Henry VI., (who was deposed in 1461,) thus accuse Lord Sands:—"Whereas, before, our forefathers had no other books but the *score* and the *tally*,—thou hast caused printing to be used, and, contrary to the king, his crown, and dignity, thou hast built a paper-mill." The insurrection of Jack Cade was ostensibly for the redress of grievances amongst the people. Shakspeare fixes the complaint of Cade against printing and paper-making some ten or twenty years earlier than the introduction of printing amongst us;—but he could not have better pointed out the ignorance of popular violence,—and all violence is the result of ignorance. The best instruments for producing good government, and equal laws for all men, have been the paper-mill and the printing-press;—and exactly in proportion as the knowledge which they embody has been diffused, have we advanced, not only in our social arrangements, but in every other manifestation of a prosperous and well-ordered community. Whatever remains to be accomplished will go hand-in-hand with the continued diffusion of knowledge.

Cause of the Migration of Fishes and Birds.—"I fear I am not entomologist enough to follow the life of the May-fly, but I shall willingly have my attention directed to its habits. Indeed, I have often regretted that sportsmen were not fonder of zoology; they have so many opportunities, which other persons do not possess, of illustrating the origin and qualities of some of the most curious forms of animated nature; the causes and character of the migrations of animals; their relations to each other, and their place and order in the general scheme of the universe. It has always appeared to me, that the two great sources of change of place of animals, was the providing of food for themselves, and resting-places and food for their young. The great supposed migrations of herrings from the poles to the temperate zone, have appeared to me to be only the approach of successive shoals from deep to shallow water, for the purpose of spawning. The migrations of salmon and trout are evidently for the purpose of depositing their ova, or of finding food after they have spawned. Swallows and bee-eaters decidedly pursue flies over half a continent; the scolopax or snipe tribe, in like manner, search for worms and larvæ,—flying from those countries where either frost or dryness prevents them from boring,—making generally small flights at a time, and resting on their travels where they find food. And a journey from England to Africa is no more for an animal that can fly, with the wind, one hundred miles in an hour, than a journey for a Londoner to his seat in a distant province. And the migrations of smaller fishes or birds always occasion the migration of larger ones, that prey on them. Thus, the seal follows the salmon, in summer, to the mouths of rivers: the hake follows the herring and pilchard; hawks are seen in great quantities, in the month of May, coming into the east of Europe, after quails and land-rails; and locusts are followed by numerous birds, that, fortunately for the agriculturist, make them their prey."—*Sir Humphry Davy's Salmonia.*

THE OPOSSUM.

(*Abridged from an account in Cuvier and Geoffroy de St. Hilaire's Mammalia.*)

Though most travellers, struck with the singular organization of this animal and the manner in which it rears its young, have entered into details upon its structure and habits, none have done so with so much exactness as M. de Azara, in his 'Quadrupeds of Paraguay.'

The characteristics of the species may be thus represented. The toes are five to each foot, armed with very feeble claws, and the great toes of the hind feet are altogether without them, and are opposable to the other toes, the hind feet thus forming real hands, to which the name of *pedimanes* has been given. The opossums move their feet very singularly in walking, which is to them an operation of labour and difficulty. The tail is flexible, and very strong; and the animal is reported to suspend himself by it in order to watch for passing prey. It does not appear that the opossums have any other voice than a blowing like that of cats when menacing. The females have under the belly a pouch, in which it is believed that the young opossums, born prematurely, complete their development. This particular organ, which has the power of opening and closing, contains the teats, which seem to vary in number, twelve having been found in one female, while another only had ten. The opening is a longitudinal cleft, which conducts backward to a bag of very small dimensions, the abode of the young ones, and which extends with age and the number of young it is required to accommodate. The period of gestation is about twenty-six days, and the young sojourn about fifty in the pouch. Azara has seen the young about five inches long, with their eyes closed, and the hair just beginning to appear, adhering to the teat, their hold on which they retain with remarkable tenacity. The animal is eleven inches in length, from the occiput to the root of the tail; the tail is about the same extent; the head is six inches; and the height, at the fore part of the back, is from seven to eight inches. The body is of a greyish-yellow colour, resulting from the hairs being dirty-white in most of their length, and black or brown at the extremities; but some entirely black hairs are here and there interspersed with the white. The feet, the ears, and the extremity of the snout, are naked.

The organs of sense and motion in the opossum do not offer many indications of activity and strength. His little eyes are nearly without eyelids, though the nictitating membrane is well developed, and completely covers the eye, which is rather prominent, resembling the segment of an ellipsis, with a pupil of

vertical length, like that of a cat. His nostrils, at the extremity of a long snout which overhangs the jaw, open upon the sides of a naked muzzle; and his smell is the most delicate sense the animal possesses, and the best of his resources. The tongue is covered with very rough papillæ. The ears have the power of closing, and turn upwards and backwards by means of three longitudinal folds, and are brought down by transverse folds, much more numerous, which cut the former at right angles. The movement, in both cases, is doubtless determined by a particular muscular apparatus.

An individual opossum, which is referred to in the above description, was fed with raw meat and soaked bread. He lapped in drinking; but was seen to receive in his mouth the water which fell drop by drop from the top of his cage; and whenever occasion offered, he repeated the same exercise, and appeared to find much pleasure in it. The seat of feeling seemed to be principally in the feet, which are covered with a very fine skin, and are furnished with very delicate tubercles, the forms and relations of which are too complicated for description.

In its wild state the opossum scoops out for himself a burrow near the bushes in the neighbourhood of habitations. He sleeps during the day, in which he sees but badly; but by night he is abroad to seek his food. He mounts the trees, penetrates into the poultry yards, attacks the hens and small birds, sucks their blood, devours their eggs, and when he is satisfied, returns to conceal himself at the bottom of his retreat. He often contents himself with reptiles and insects, and will even eat fruit. With habits of life analogous to those of the fox and the pole-cat, he is much less cruel and sanguinary; nor is he so well furnished as they with the means of defence. It has been already stated that he runs but badly; and though the mouth is extremely large and well armed, it wants force. The opossum is, besides, a stupid animal, and without that intelligence which might serve him against his enemies. He endeavours to bite the stick that strikes him, but not the arm that directs it; differing in this respect from most other mammalia, which, by a very remarkable act of intelligence, distinguish the person who aims the blow from the instrument which strikes, and attack the former. It appears that his principal means of defence consist in an abominable odour which he emits when in danger, and which M. de Azara, who in the assertion speaks from his own experience, declares that it requires a great effort of reason to support.

The peculiarity of construction of this and other marsupial animals occasioned the first describers of them to be considered rather as inventors than as trustworthy witnesses, and it was a considerable time before they were correctly represented. Even Buffon (though learnedly and very elaborately exposing the error of other writers with respect to this singular animal, or rather class of animals) has given a very inaccurate description of it, confounding the opossum of Virginia and kangaroo of New Holland; but giving for the former a figure unlike either, though between both.



[Male and Female Opossums.]

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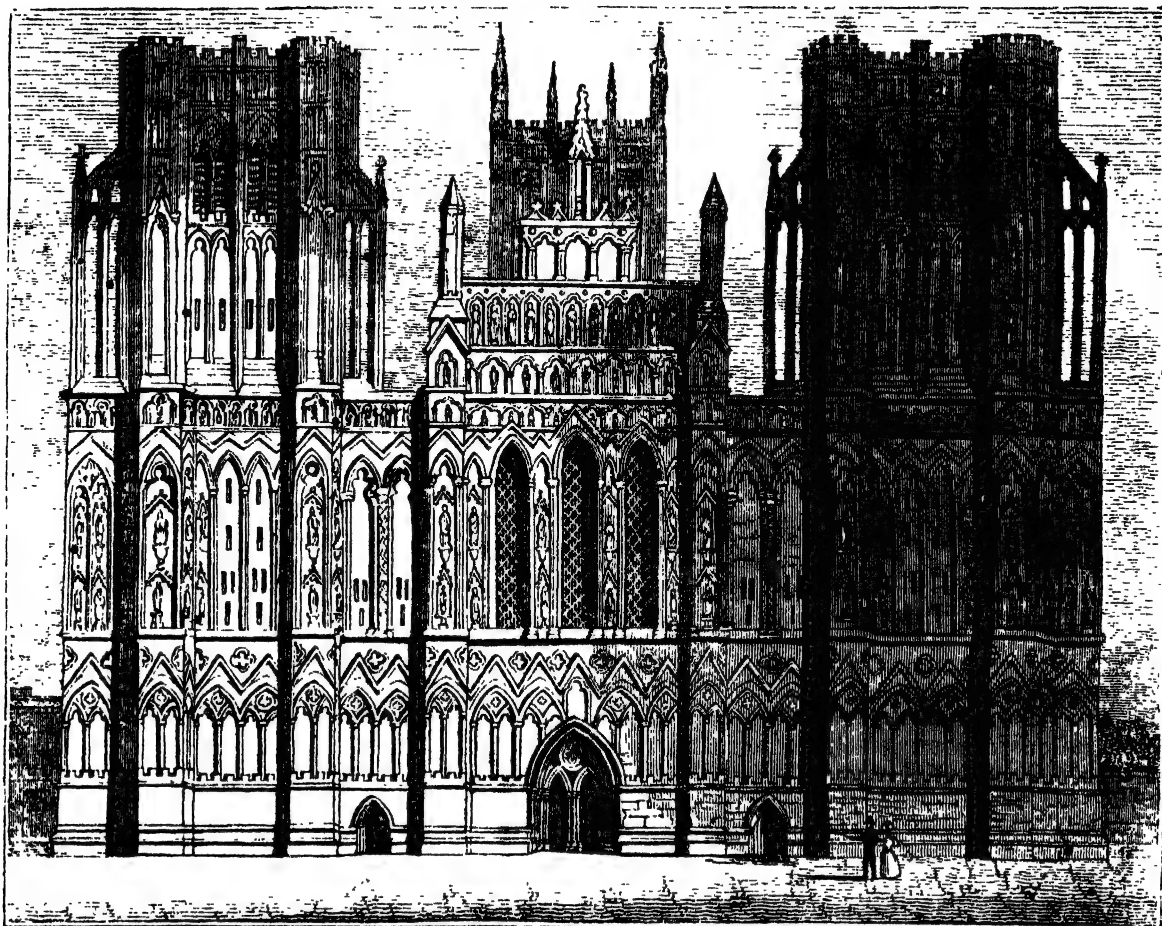
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CATHEDRAL OF WELLS.



[West Front of the Cathedral of Wells.]

This is, in many respects, one of the most magnificent of our cathedrals. Its form is the usual one of a cross, the principal limb or bar, which extends from east to west, being 371 feet in length, and the other, or the transept, measuring 135 feet from north to south. Over the junction of the nave and transept is a tower rising to the height of 160 feet; and two other massive towers, each 126 feet in height, crown the extremities of the west front. This façade, as may be seen from our wood-cut, presents a remarkably splendid display of tracery and sculptured figures. Altogether, there are introduced into the composition no fewer than 150 statues of the size of life, and above 300 others of smaller size. Notwithstanding the mutilation which nearly all of these sculptures have undergone, the effect of so vast a throng of figures, and of the elaborate decoration of every niche and buttress, is rich in the extreme. The towers, by which the whole is surmounted, add greatly to the grandeur of the display, and make this erection altogether one of the most noble and imposing of which the architecture of the middle ages can boast.

The first church at Wells is said to have been founded by the great Ina, king of Wessex, in 704. The town, however, does not appear to have become the seat of a bishopric till the reign of Edward the Elder, in the beginning of the tenth century. But the early history of the see is extremely obscure. The first bishop of whom there is any certain account is John de Villula, who, before his elevation to the mitre, is said to have practised physic at Bath, and by that means to have earned the means of purchasing the see from the rapacious Rufus. This was about the year 1091. As soon as he obtained his ecclesiastical dignity, De Villula removed the episcopal seat from Wells to Bath, whether with the object of still continuing to pursue his original profession we do not know, but, at any rate, not without all the opposition in their power from the subordinate functionaries of the former church. The act, indeed, was the occasion of bitter and long-protracted animosity between the Wells and Bath establishments; whose disputes were rather appeased for the moment than finally settled by the decision of De Villula's successor, Bishop Robert, about the year 1139, that the diocesan should be styled Bishop of Bath and Wells, and be enthroned, on his admission, in both churches. De Villula had thrown aside the old title altogether, and called himself Bishop of Bath only. But although this prelate is not spoken of in very laudatory terms in the chronicles of his church, and his slight regard for the more ancient seat of his bishopric, in comparison with the city in which he had

been accustomed to exercise his lay functions, seems to have been strongly enough manifested, he was probably a person of much greater merit than his detractors would lead us to conclude. From his successful practice as a physician, we may suppose that in learning and scientific knowledge he was considerably beyond his age. Notwithstanding, too, what is reported of the way in which he obtained his bishopric, he does not appear to have been deficient in the munificence becoming his place. He built, out of his revenues, a new church at Bath, being the structure which preceded the present abbey church. At Wells, however, he allowed the cathedral to fall to ruin; and he also gave great offence, not unnaturally, to the canons, by pulling down a cloister, hall, and dorter, or lodging place, which one of his predecessors, Bishop Giso, had built for them, and erecting a residence for himself on their site. It must be confessed that he would seem to have carried matters with rather a high hand.

De Villula died in 1123, and was succeeded by Bishop Robert, already mentioned, who repaired or rebuilt the cathedral, which his predecessor had allowed to go to decay. After him Reginald Fitz-Joceline, Archdeacon of Salisbury, was appointed to the see. This prelate, who was afterwards elected Archbishop of Canterbury, though he died before his actual removal to that see, obtained from King Richard I. a strange grant, the original of which is still preserved, giving him and his successors the right of keeping dogs for hunting over all the county of Somerset, as fully, so it runs, as any of his predecessors had ever enjoyed the same.

The present cathedral was begun in the early part of the reign of Henry III., or before the middle of the thirteenth century, by Bishop Joceline de Welles, or Troteman, as he is otherwise called; who also made Wells his place of residence, and in other respects restored it to the precedence which, in everything except the title of the see, it has since retained.

The entire body of the church, from the west end to the middle of the present choir, is supposed to be the work of Bishop Joceline de Welles. The two western towers, however, were only added, that on the south about the end of the fourteenth century, by Bishop John de Harewell, and that on the north, about twenty years after, by Bishop Bubwith. Before this the body of the church had been completed to its eastern extremity; and the great central tower had also been erected by Bishop Drokensford, soon after the commencement of the fourteenth century, in the reign of Edward III. This at least is Mr. Britton's conjecture, from the style of the architecture.

The interior of the greater part of this cathedral partakes of the massive character which belonged to the earliest age of what is called the Gothic style. The eastern portion, however, which is of later date, is distinguished by much greater lightness. But the glory of the cathedral is the Lady Chapel, placed, as usual, beyond the choir. Here the columns are formed of clusters of the most slender and elegant shafts, crowned with capitals of exquisite richness and beauty; while all around is a profusion of the most elaborate ornament. As a whole this chapel has been sometimes esteemed the most beautiful and perfect gem of ecclesiastical architecture in England.

Many ancient and some sumptuous monuments are dispersed over the different parts of the cathedral. Of these one of the most remarkable is that of Bishop Thomas of Beckington, who died in 1465, after having, during the twenty-two years that he held the see, expended large sums on the repair and extension of the cathedral. It is in the choir, and presents a very rich and elaborate display of carving and sculpture.

The cloisters, the chapter-house, and the bishop's palace, which are in the vicinity of the cathedral, are all highly deserving of inspection. The cloisters form a large quadrangle attached to the south side of the church, the sides measuring severally from 150 to 160 feet in length. Over the east side is a large room containing the library of the establishment, which was built by Bishop Bubwith in the early part of the fifteenth century. The chapter-house is a handsome octangular building, of 52 feet diameter in the interior, the roof being supported by a single central pillar. The episcopal palace, which stands at a short distance south from the cathedral, has quite the appearance of an old baronial castle. It is a large, irregular structure, and is surrounded not only by a lofty embattled wall, but also by a broad moat full of water the grand entrance being by a bridge thrown over the north side. The entire extent of the inclosed space is about seven acres. North-west from the cathedral is the deanery-house; and beyond that are twenty houses forming what is called the Vicars' College or Close, an establishment consisting of two principals and twelve vicars, five of whom are distinguished as seniors.

The town and cathedral of Wells stand in a valley at the foot of the Mendip Hills, near the source of the river Ax, and also near that of another spring called St. Andrew's Well, from which the place is supposed to derive its name. Hills rise at a little distance nearly all around, some being wooded, while others are covered only with their native green sward. The cathedral forms a striking object as seen from all the great roads leading to the city.

OLD TRAVELLERS.—WILLIAM DAMPIER.

No. 3.—(*Conclusion.*)

After reposing for awhile at Juan Fernandez, Dampier, his friend Wafer, and the rest of them, cruized off the coasts of Peru and Chili, where they took several Spanish prizes, but met with no very signal success. Dampier, however, saw with great delight the towering mountains and volcanic peaks of the Andes. Judging that he was not to make his fortune this trip, (but money to him seems always to have been a secondary consideration,) he let his passion for seeing new countries lead him; and wishing to obtain some knowledge of the northern coast of Mexico, he quitted his old comrades and joined another buccaneer, called Swan, who had also found his way into the South Seas, where he intended cruizing in hopes of capturing the annual galleon from Mexico. The rich Spanish ship escaped them, but Dampier obtained and carefully registered the knowledge he sought for. After encountering more perils than prizes along the shores of Mexico, California, and other parts of the American continent, and losing fifty of their men who were cut to pieces by the Spaniards at Santa Pecaque, Captain Swan and Dampier thought it would be more to their profit to sail for the East Indies. They had some difficulty in persuading the ignorant sailors to consent to this, for having never heard of such a route to that part of the world, the common men thought it impracticable. The science of Dampier (who was enraptured at the prospect of so new and long a voyage), and the eloquence of Captain Swan and other of the officers, triumphed, however, over the ignorance of the men; and the Indian voyage being determined upon, they made sail for some uninhabited islands off the Californian coast, where they careened their ships. During their stay here, Dampier underwent an extraordinary process of sand-baking. He says, "I had been a long time sick of a dropsy, a distemper whereof many of our men died; so here I was laid and covered all but my head in the hot sand; I endured it near half an hour, and then was taken out and laid to sweat in a tent. I did sweat exceedingly

while I was in the sand, and I do believe it did me much good, for I grew well soon after."

On the 31st of March, 1686, these daring mariners set out from Cape Corrientes to traverse the vast, and then very imperfectly known, Pacific Ocean. The distance to the Ladrone Islands, their nearest point, was variously calculated by Spanish and English books of navigation, at 1900, 2300, and 2400 leagues. Captain Swan persuaded his men that the calculation which gave the shortest distance was the correct one;—he assured them that Sir Francis Drake and others of our old circumnavigators had made the run in less than fifty days, and, as ships were better built now than then, he felt confident he should reach the Ladrones in little more than forty days. The sailors had some need of these assurances, for the only provision they had with them was a small quantity of Indian corn, which, at the low rate of little more than half a pint for each man per day, would only last them sixty days; nor were they at all sure, whether, on making the Ladrone Islands, they should be able to obtain fresh supplies. "But," says Dampier, "our bold adventurers seldom proceed with much wariness,"—and across the Pacific was the wealthy Spanish port of Manilla, which blinded them to many dangers. During the voyage the buccaneers flogged one of their men for stealing, encountered many perils, and endured dreadful privations. At last, however, on the 20th of May, when the men were half starved and mutinous, they saw, to their infinite joy, one of the Ladrone Islands before them. "And well it was for us," says our traveller, "that we got sight of it before our provision was spent, for, as I was afterwards informed, the men had contrived, first, to kill Captain Swan and eat him, and after him all of us who were accessory in promoting the undertaking of this voyage. This made Captain Swan say to me after our arrival, 'Ah! Dampier, you would have made them but a poor meal!' for I was as lean as the captain was lusty and fleshy."

After staying twelve days at the island they had reached so opportunely, and procuring a supply of provisions and water, the hardy adventurers shaped their course for the Philippine Islands, among which they arrived on the 21st of June, and where they remained (chiefly at Mindanao) till the 14th of January. This place had so many attractions, that six or eight of the buccaneers ran away, resolved to stay there; and as Captain Swan lived constantly ashore, showing little disposition for future enterprise, and as the mariners were suspicious of his projects, they seized the ship and sailed away without him. While they were at Mindanao the most violent disputes ensued among the freebooters. "The main division was between those that had money and those that had none." "The latter," Dampier continues, "grew drunk and quarrelsome; which disorderly actions deterred me from going aboard, for I did ever abhor drunkenness." (He was, however, on board when the ship sailed.) Sixteen of the men fell victims to their intemperance and the jealousy of the natives, and were buried near Mindanao river.

The ship was now in the hands of "a mad crew;"—they seem to have proceeded at random from place to place, chiefly between the promontory of Malacca, Cochin China, China, and the Philippines. Though this gave Dampier the opportunity of seeing an immense deal of the world, and of acquiring much new information, particularly concerning the mysterious Chinese empire, he grew weary of his situation, alarmed at the imprudent conduct of his companions, and very anxious to escape from them to some English factory in India. He was reconciled, however, when he learned that the buccaneers intended to sail by a very circuitous route, from the Indian Ocean to the Red Sea. "I was well enough satisfied," he says, "knowing that the farther we went the more knowledge and experience I should get, which was the main thing that I regarded." Such were the ardour and constancy of this extraordinary man in the pursuit of knowledge.

Dampier's associates were, however, by this time so unruly and capricious, that there was no counting on any plan they made. We find them shortly after loitering at the Celebes, then at Timor, and then at Australia Incognita or New Holland, which immense country was very little known at that time. Whilst staying at New Holland, Dampier endeavoured to persuade the men to sail for some English factory or establishment in India, but they threatened to turn him ashore, and leave him among the wretched savages of the island, if he ever mentioned the subject again. On this he resolved to make his escape from them at some convenient place. Sailing from New Holland, they arrived at the island of Triste, near to Sumatra, in about a month. This would have been a good point of departure for Dampier, but he could not compass his escape. He, therefore, went on with the ship to the Nicobar Islands in the south-east of the Bay of Bengal, and there, with two other Englishmen, was, after much opposition on the part of the crew, permitted to remain. He was soon after joined by four Malays, belonging to Acheen in Sumatra, who, with their proa, had been taken by the buccaneers, and were now liberated. Dampier, who, like Robert Knox, the captive in Ceylon, had a decided commercial turn, and a quick eye to the natural products and advantages of a country, thought he saw a prospect of establishing a profitable trade in ambergris, which abounded in the Nicobars, with the quiet but shy natives, and of making thereby a considerable fortune for himself. To carry this into effect, however, it was necessary to reach some European settlement, where they could procure axes, cloth, and such articles as would be acceptable, in way of barter, to the natives, who cared not for money as a medium of commercial intercourse. They accordingly went in a canoe to the east side of the island, and thence, on the 15th of May, 1688, being eight individuals crowded in a small and fragile boat, they intrepidly started for Acheen in Sumatra. The distance was forty leagues, and an open, and frequently a most tempestuous sea lay between the two places. They were baffled by strong currents, and then exposed in their egg-shell of a boat to a fearful storm, which Dampier has described with wonderful nature and force. "I had been," he says, "in many imminent dangers before now, but the worst of them all was but a play-game in comparison to this. * * * Other dangers came not upon me with such a leisurely and dreadful solemnity. A sudden skirmish or engagement, or so, was nothing when one's blood was up, and pushed forward with eager expectations. But here I had a lingering view of approaching death, and little or no hopes of escaping it; and I must confess that my courage, which I had hitherto kept up, failed me here; and I made very sad reflections on my former life, and looked back with horror and detestation on actions which before I disliked, but now I trembled at the remembrance of. I had long before this repented me of my roving course of life, but never with such concern as now."

The storm at length abated, and after a wonderful escape they reached Sumatra, but in a wretched state of health. An English captain at Acheen proposed a trip, with which, at another time, Dampier would have been enchanted: it was to go to Persia, where they were to sell the ship, then join the caravans to Aleppo, "and so home for England;" but at present his health and spirits were sunk, and he thought the end of his wanderings would be a grave in Sumatra. He soon, however, rallied; in 1688 he made a voyage to Tonquin, the next year another to Malacca, then another to Fort St. George, whence he returned to Bencouli in Sumatra.

where he served for five months as a gunner to the fort of an English factory. In all these vicissitudes, in sickness or in health, Dampier continued to acquire knowledge and keep his journals. Finding the governor of the fort at Bencouli to be a vulgar tyrant, he determined to leave that place. "I had other motives also," he says, "for my going away; I began to long after my native country, after such a ramble from it; and I proposed no small advantage to myself from my Painted Prince."

This painted prince was afterwards well known in England, where he was exhibited for money, and where he ultimately died (at Oxford) of the small pox. He was the son of a chief of one of the Spice Islands, but having been taken by an enemy, and passing through several hands as a slave, fell at last into those of an English trader, called Moody, who gave Dampier a half share in him, and left him entirely at his disposal. Our traveller, in this curious partnership in a human body, had larger views than those of a common showman. He says, "Besides what might be gained by showing him in England, I was in hopes that, when I had got some money, I might there obtain what I had in vain sought for in the Indies, viz., a ship from the merchants, wherewith to carry him back to Meangis and reinstate him there in his own country, and by his favour and negociation to establish a traffic for the spice and other products of those islands."

Accordingly, having made an agreement with a friendly captain bound for England, and shipped his painted prince, Dampier, eluding the vigilance of the governor of Bencouli, crept through one of the port-holes of the fort, got on board the ship, and sailed for home (which he had last left in 1678) on the 25th of January, 1691. After touching at the Cape of Good Hope and the Island of St. Helena, he came to anchor in the Downs, on the 16th of September, 1691, having completed the circumnavigation of the globe. On reaching London he was so poor as to be almost immediately obliged to sell his share in the painted prince, whom he affectionately describes as an interesting, amiable savage.

Part of Dampier's time, between the period of his return to England and his departure on fresh adventures in 1698, was employed in compiling from his journals, and publishing an account of his voyages and travels, which appeared in two straightforward, unostentatious volumes, and were received as they merited.

He is next heard of as a commander in the king's service of a sloop-of-war, with twelve guns and fifty men. With this vessel, which was disgracefully appointed, and with a bad, mutinous crew, Dampier sailed from the Downs on the 14th of January, 1698, on a voyage of discovery. He went to New Holland, New Guinea, Tymor, Java, and numerous other places, ably performing the service with which he was entrusted; but on his return homeward, the ship, which appears to have been rotten from age, foundered at sea, near the uninhabited Isle of Ascension. Dampier and his crew with difficulty reached the island, where they lived upon wild goats and turtle, until an English East Indiaman fortunately took them up and carried them home. He published an interesting account of part of this voyage, but never finished it, "being obliged," he says, "to prepare for another voyage sooner than was expected." This is the last we learn of his adventures from himself, for he never published again. It has been ascertained, however, that he afterwards commanded a ship in the South Seas, and then, in the capacity of pilot, accompanied Captain Woodes Rogers in a voyage round the world.

Where the wandering life of this extraordinary man terminated—where his ashes were at last laid at rest, whether in the great deep, in some island in the Pacific or the Indian Ocean, or on "the small estate in Dorsetshire near his native county of Somerset"—we have not been able to discover. A portrait of him is preserved in the Trinity House, London.

His voyages, with 'A Discourse of Winds, Breezes, Storms, Tides, and Currents,' have often been reprinted, in three volumes, octavo. They are written in strong, idiomatic English, and bear evidence of extreme veracity. The nautical portions are highly esteemed by professional and scientific men, whilst his descriptions of the inhabitants of the numerous countries he visited, and of the objects of natural history, are so fresh, clear, and yet detailed, that they must delight every reader. His style is, indeed, highly picturesque and descriptive; his sentiments are generally good and generous; and though he was for so many years the associate of lawless men, he preserves a moral tone in his writings.

ITALIAN LETTER-WRITERS.

Some years ago it was no uncommon thing, particularly in those parts of London near the river, as Wapping and Shadwell, to see stuck in the window of a shop or in front of a stall, such inscriptions as "Letters written here," "Letters written to all parts of the World," "A large assortment of letters on all sorts of subjects to be found within," &c. &c.

These inscriptions, however, have been gradually disappearing with the spread of education among the people. No doubt there are still many individuals in London who cannot write, and that much remains to be done in the important branch of popular instruction, but it is equally certain that at the present day there are few families, even among the poorest, without some member of it, or without some friend or neighbour, that is qualified to carry on its limited correspondence;—and thus the occupation of a general public letter-writer is going, and is almost gone, from among us in London.

Far different is it at Rome, and still more so at Naples. In both these cities a body of men not inconsiderable in number, and who have no other occupation whatever, gain their bread by writing letters for the poor and uneducated classes. These humble yet important functionaries—for in no condition of society can the faculty of carrying on a correspondence of affection or of business by means of letters be considered otherwise than important—do not, generally speaking, occupy either shop or stall, but ply their labours in the open air. Their portable establishment, or stock in trade, consists of an old rickety table, with sometimes a desk upon it, two low stools, (one for the writer, the other for the customer), a few sheets of paper, some pens, a penknife made like a razor and almost as big, a still more oddly-shaped inkhorn, and a pair of spectacles, either to aid their sight or to give a grave look. Thus furnished they sit through the day, generally near to the post-office, either despatching business or waiting for it. The variety of subjects they have to discuss is of course almost infinite; but as people are never more inclined to write than when they are in love, and as the poor Italians are a very loving and (be it said to their honour, and the shame of their rich and noble countrymen) a very virtuous people, these scribes have, perhaps, love-letters to write more frequently than any other kind of epistle.

The grave, dignified, and sagacious-looking old man represented in our engraving, is engaged on that tender subject, which contrasts singularly with his years, his long white beard, and wrinkled countenance. The fair *contadina* *, kneeling by the side of his table, has placed upon it an open letter, in the corner of which we read the endearing words "*anima mia*," or "my soul," and it is doubtless to this she is dictating an answer, counting the periods, in true Italian fashion, on her fingers, while the venerable scribe is mending his pen

* Country girl or peasant.



[The Roman Letter-Writer.]

and catching his theme previously to beginning his flourish. The picture from which our wood-cut is taken was painted at Rome by Mr. J. P. Davis. The scribe is no invention of the painter's, but a well-known character at Rome, where he is probably still to be found, as he used to be a few years since, pursuing his vocation in fair weather and in foul—acting as the organ of the poor and the lowly, with an enviable indifference to all the great world around him. Our wood-cut conveys an imperfect idea of the picture, which is distinguished for the delicacy of expression in the female figures, and the beauty of its colouring. Youthful faces bearing the same tender earnestness of expression and (particularly at Rome) the same degree of poetical beauty—*contadine* engaged in precisely the same manner—must have struck the eye of every traveller who has not confined his attention to operas, conversazioni, and picture-galleries, but extended it to what passes in the humbler streets and bye-places occupied by the people:—where, as Dr. Johnson observed long ago, national character best displays itself.

To all future travellers of this kind, or investigators of popular manners and feelings, we would recommend the stalls of the public letter-writers at Naples, where, owing to the people being still less educated than in the states of the pope, and the population being more than double that of Rome, they abound much more than in the "eternal city." In a *vico*, or lane, by the side of the post-office of Naples, they generally "plant the desk," as they are there at hand not only to write answers but to read the letters as they arrive,—for the accomplishment of reading is almost as rare as that of writing among the poor Neapolitans. There, close to the iron-grated windows of the post-office through which the letters are delivered, the patient *scrivani* sit from eight o'clock in the morning till the dusk of evening. In the lane there is an archway, some few yards in length, formed by a building that permits a passage beneath; and here part of them draw their tables to be protected from the scorching rays of the sun in summer, and, partially, from the cold in winter. Those who cannot avail themselves of this shelter fit out a piece of sail-cloth or canvass above their tables when the day is very hot. In winter, and there are many cold wintry days

even at Naples, they wrap themselves in rough old *tabarri* or cloaks, and furnish themselves each with a little earthen pot of ignited charcoal, the whole fuel of which might very well be contained in a soup-ladle.

As their customers are, of course, confined to the poorest classes,—to soldiers and sailors—their wives or sweethearts,—to sheep-drivers from Apulia or buffalo-herds from Calabria,—to servant-maids, nurses, and such sort of people,—their calling, it will naturally be supposed, is not a very lucrative one. For a letter of ordinary length their charge is about five Neapolitan *grani*, or twopence English; but this is proportionably increased to ten or even to fifteen grani; while, for petitions to the king or government, which they also write, and which the poor, sanguine Neapolitans are fond of sending in, though it does not appear they get much by the practice, they charge as much as two or three *carlini* (three *carlini* make the important sum of one shilling English!) Yet with these trifling gains the scrivani contrive to live, and, for the most part, to keep a family. They eat their maccaroni when they have had a good day's work; and now and then drive about in a corribolo or a calesso on holidays.

In a preceding Number, we have described the common Neapolitans as being a light-hearted, noisy, farcical people. The scenes of most frequent occurrence at the stands of the letter-writers, where all bawl out their private affairs aloud, and show the greatest excitement about the smallest trifles, are scenes, to the spectator, of downright farce and fun; but occasionally, and not unfrequently, these are mingled with exhibitions of thrilling passion and pathos. The poor old father, or the mother—the wife or the sister—of some sailor or soldier, or poor man, long absent, will come running to the scrivano with a letter just handed through the bars of the office, impatient, breathless, yet afraid to hear him read its contents; or, at other times, some such persons will come in the agonies of grief, displayed with all the vivacity of Italian expression of countenance and gesticulation, to avail themselves of the letter-writer's pen in communicating some fatal intelligence. These things combined,—the humour and farce with the occasional tragedy of humble life,—render the resort of the scrivani a valuable study to the artist, to the poet, and to him who would investigate the workings of the human mind under various circumstances and impressions, and without restraint or disguise.

MISAPPLIED LABOUR.

IN all ages the love of overcoming great difficulties, without any proportionate end in view, has prevailed in a greater or less degree. Some notice of a few of these "impertinences" (as they have been quaintly termed) may not be unentertaining to the reader.

In No. 285 of the 'Philosophical Transactions,' Dr. Oliver gives an account of a cherry-stone seen by him, in 1687, on which were carved one hundred and twenty-four heads so distinctly, that the naked eye could distinguish those belonging to popes, emperors, and kings, by their mitres and crowns. It was bought in Prussia for £300, and thence conveyed to England, where it was considered an object of so much value, that its possession was disputed, and became the subject of a suit in Chancery. In ages far more remote we are told of a chariot of ivory, constructed by Mermecides, which was so small that a fly could cover it with his wing; and also of a ship, formed of the same materials, which could be hidden under the wing of a bee. Pliny tells us, that the 'Iliad of Homer,' an epic poem of fifteen thousand verses, was written in so small a space as to be contained in a nut-shell; while Elian mentions an artist who wrote a distich in letters of gold, which he enclosed in the rind of a grain of corn. In our own country, in the reign of Queen Elizabeth, similar feats of penmanship were performed. The Harleian MS., 530, mentions "a rare piece of work brought to pass by Peter Bales, an Englishman, a clerk of Chancery:" this was the whole Bible contained "in a large English walnut no bigger than a hen's egg; the nut holdeth the book; there are as many leaves in his book as the great Bible, and he hath written as much in one of his little leaves as a great leaf of the Bible." This wonderful performance, we are informed, "was seen by many thousands." In the Curiosities of Literature' we meet with many other accounts of similar ingenious exploits, which show what perseverance may effect, although they lead us to regret that so much industry and talent should have been so ill bestowed.

There is a drawing of the head of Charles II. in the library of St. John's College at Oxford, wholly composed of minute written characters, which at a small distance resemble the lines of an engraving. The lines of the head and the ruff are said to contain the Book of Psalms, the Creed, and the Lord's Prayer. In the British Museum is a portrait of Queen Anne, not much above the size of the hand. On this drawing are a number of lines and scratches, which, it is asserted, include the entire contents of a thin folio, which is there also to be seen.

The present age does not offer so many proofs of ill directed industry and frivolous performances. Some object of utility is now generally proposed; and the rapid improvements which are daily being made in every branch of art, and the continual additions we in consequence receive to our means of comfort and convenience, seem to prove that the pursuits of the ingenious are more generally directed to objects of real benefit.

It is not enough to exert industry and perseverance; these are but the tools with which we work out some great end: the mind must be enlightened to direct and use these tools to good purpose, for the advantage of the workman and for the general good.

CAPACITY OF BODIES FOR WATER.

As it may be interesting to many to know the comparative as well as the positive absorption of water by various bodies, we subjoin the following table, the details of which were made with care. The weight of each substance was ascertained before immersion; next, when the water ceased running and began to drop; and, lastly, when all dropping had ceased, and the bodies were in that state in which they may be supposed to be full of moisture.

Weighed.	Dry.		Dripping.		Done Dripping.	
Flannel	144	grs.	1553	grs.	700	grs.
Woollen Cloth	56	"	370	"	191	"
Linen	375	"	2110	"	1050	"
Calico	115	"	1150	"	450	"
Cambric Muslin	95	"	883	"	307	"
Very fine do.	54	"	715	"	297	"
Glove Leather	106	"	1170	"	677	"
Kid do.	172	"	770	"	421	"
Shoe do.	95	"	194	"	177	"
Sponge	185	"	2440	"	2070	"

From these data the following table may be constructed, to show in the first instance the absorbing powers, and, in the second place, the retaining powers, for moisture, of the various bodies thus experimented upon

Flannel absorbed	11	and retained	5	times its weight of water
Woollen Cloth	6½	"	3½	"
Linen Cloth	5⅗	"	3	"
Calico	10	"	4	"
Cambric Muslin	9	"	3⅓	"
Fine Muslin	13	"	5	"
Glove Leather	11	"	6⅓	"
Kid do.	4½	"	2⅓	"
Shoe do.	2	"	2 less a fraction	
Sponge	13	"	11	"

From these results, it may be seen, that although some substances, in the first instance, take up an equal, or nearly an equal quantity of water with the sponge, such as the flannel, fine muslin, and glove-leather, yet their powers of retaining the same are very far inferior.

AN ARMENIAN MARRIAGE AT CONSTANTINOPLE.

(*From a Correspondent.*)

Some time since I gave you an account of a Greek wedding in Asia Minor; the ceremonies attending an Armenian marriage in the same country, at Constantinople, and all over the East, are still more curious. They are much too long and tedious to be given in detail, but I will endeavour to point out some of their most amusing peculiarities. The Armenians, who are an industrious, thrifty, and quiet people, are very numerous in Turkey: they are Christians, but divided into two classes; the most numerous adhering to the doctrine of the old Armenian church, or what is termed the heresy of Eutyches, and the minor class professing the religion of the church of Rome. The account of a marriage which I propose to give of course applies only to the former class.

These Armenians keep their wives and daughters as much apart from all male society as the Turks do theirs. When abroad their women are veiled and muffled up, so as to be distinguished from the Turkish fair only by the different colours of their slippers and robes. Indeed the whole of their domestic economy (except in not admitting a plurality of wives) and their manner of living differ in scarcely anything from those of the Turks. Courtship and attachment before marriage are, therefore, things unknown among them.

When a young man is to be married, his mother selects the bride; and matters being arranged between the two families, an interchange of presents ratifies the treaty and forms the betrothal. The nature of these presents is strictly regulated by ancient law and usage, and each present, as it passes, is blessed by a priest.

After two days of feasting and ceremony, on the morning of the third day the bridegroom, accompanied by all his relatives and friends, goes to fetch his bride from her father's house to his own. On their meeting, his father-in-law presents him with a bright new watch, and his mother-in-law and her nearest relations hang pieces of gold tinsel to his calpack or great hat. He is then introduced to his bride, who sits immoveable on a low sofa in a corner of the room, and so completely covered with dresses, that not so much as the point of a finger or of her slipper is visible. A thick white linen veil, only used on this solemn occasion, and called a *perkem*, is thrown over her head; and over this again is thrown another veil, composed of tinsel and thin lamina of gold, or sheets of gilt paper. The only part of the bride left uncovered is her hair: this flows down, and, joined to a mass of false hair, rests upon the sofa.

The officiating priest raises the bride from the sofa, leads her, blindfolded as she is, to the centre of the room, and there, pronouncing a blessing over them, places her hand in that of the bridegroom. All present then form in order of procession. A priest goes first, carrying a lighted torch, then follows the bridegroom, and the march is closed by the bride, who, unable to see her way, is led by two female relatives. On arriving at the bridegroom's house the bride is smoked with incense, burning in a silver dish, and then sprinkled with rose-water. After this, she is led into an inner room and left alone with the females.

The bridegroom proceeds to another apartment, where a barber is ready to shave him. As the Armenians shave all their head like the Turks, this is rather a long process. When it is finished the priest produces his wedding suit of clothes, and blesses each article as he presents it. As soon as the happy man is attired he is re-conducted to his bride, who then rises from the sofa, and after being enveloped by the matrons in an immense shawl called a *duvack*, or coverall, advances to meet him in the middle of the room.

There the priest again joins their hands, and knocks their foreheads gently together. Two assistant priests then place in the centre of the apartment a table, on which are two wax-lights (like the torches of Hymen in the ceremonial of the ancient Greeks and Romans). The priests then chant some passages from the Gospel in Armenian. While this chanting proceeds, one of the family holds a large crucifix over the bridegroom and bride, who again touch foreheads, and so continue to lean against each other. When the priest has done singing, he produces two silken strings precisely alike, each being made of a thread of white silk, interwoven with a thread of rose-coloured silk. The first of these he ties round the brow of the bridegroom, immediately over whom the crucifix is then held, and puts these singular questions, making a solemn pause between each.

"If she is blind, thou acceptest her?"

"If she is lame, thou acceptest her?"

"If she is hump-backed, thou acceptest her?"

The bridegroom's brief response is "I accept."

The priest then ties the second silken string round the head of the bride, who at the moment stands under the crucifix, and says,

"Thou acceptest."

Her answer is, "I accept."

On this all present shower small pieces of money on the couple, the cross is waved triumphantly over their heads, the priests again chant, the wax torches are extinguished, and the pair are man and wife.

The husband and all the men then quit the apartment. During their absence the matrons remove the *durack*, and some of the robes, under which the bride is almost suffocated. At a given signal the husband is re-admitted, the matrons withdraw the linen veil, and then for the first time he sees the features of his wife. He is, however, only favoured with a glance. All the company are admitted; and though the linen veil is not again drawn, her head is covered with the tinsel and gold sheets. All the females invited to the festival then approach the sofa where the bride is seated, kiss her, and put some present into her hand. After this all her male relations to the remotest degree are permitted to raise the tinsel, and gaze for a moment at the bride's face, and to kiss her hand, into which every one of them puts a present. A feast then commences, and with a series of eastern amusements in which there is little variety, continues for three days with scarcely any interruption. All this time the bride remains mute and motionless on the sofa. It would be the height of indecorum for her to speak a word, even in a whisper, to any other person than an old matron, sometimes her nurse, who has accompanied her from her paternal roof. The Armenians, who are generally a frugal, abstemious people, eat and drink immoderately on these occasions. Many of the dishes are regulated by old laws.

Towards the conclusion of the third day, the principal officiating priest repairs to the bride, and having summoned the bridegroom to his presence, he with great solemnity removes the silken string which he had tied round the head of each, and carries away the tinsel veil which had hitherto concealed the lady's features.

After this the wife is left for the first time with her husband, and permitted to speak; but, according to the old laws, she is not to open her lips for a whole twelvemonth in the presence of her mother-in-law or her married sister-in-law. The ancient Armenian rescript is positive on this head; and though the harsh rule is now, at least at Constantinople, relaxed in practice, the young wife must maintain a show of profound respect and absolute submission to her husband's relatives.

Perhaps no people in the world are more attached to their old national laws and usages than the Armenians. A custom, if it is ancient, has with them the force of a religious dogma, and is as much venerated. Even the marriages of the poor are not relieved from these cere-

monials; but as the poor cannot afford the means, the Armenian church and the rich of its communion come to their aid, and lend the robes, dresses, &c., and furnish materials for the long feast, rather than suffer their old customs to be infringed. Every Armenian church has a depôt of pots and pans, plates and dishes, to lend to the poor on these occasions.

In M. Picard's great work on ceremonies, and religious customs, in the works of Tournefort and other eastern travellers, the reader may find circumstantial, and still more extraordinary accounts of Armenian weddings. The memoirs of Artemi (a native Armenian), which were published in English a few years since, also afford some curious and authentic particulars.

PULQUE.

(*Abridged from Black's Translation of 'Humboldt's New Spain.'*)

THERE hardly exists a race of savages upon the face of the earth who cannot prepare some kind of beverage from the vegetable kingdom: yet there are few nations who cultivate certain plants merely with a view to prepare beverages from them. The most part of civilized nations draw their drinks from the same plants which constitute the basis of their nourishment; and the old continent affords us no instance of vine plantations but to the west of the Indus. But in the new continent we have the example of a people who not only extract liquors from the amylaceous and sugary substance of the maize, the manioc, and bananas, or from the pulp of several species of mimosa, but who cultivate expressly a plant of the family of the ananas, to convert its juice into a spirituous liquor, which is called Pulque. On the interior table land, and in the intendency of Puebla, and in that of Mexico, through a vast extent of country, the eye reposes only on fields planted with pittes or maguey. This plant, of a coriaceous and prickly leaf, which, with the *cactus opuntia*, has become wild since the sixteenth century throughout all the south of Europe, the Canary Islands, and the Coast of Africa, gives a peculiar character to the Mexican landscape.

The agaves are planted in rows at a distance of fifty-eight inches from each other. The plants only begin to yield the juice which goes by the name of honey, on account of the sugary principle with which it abounds when the hampe is on the point of its development. And as the plant is destroyed if the incision be made long before the flowers would naturally have developed themselves, it is of great importance for the cultivator to know exactly the period of efflorescence. Its proximity is announced by appearances which the experienced cultivator readily understands. He goes daily through his plantations to mark the plants that approach efflorescence; and if he has any doubt he applies to the *experts* of the village—old Indians, who, from longer experience, have a judgment or rather tact more securely to be relied on.

About the age of eight years in general, but in good soils so early as five, and in bad not till eighteen, a maguey begins to give signs of the development of its hampe. They then prepare to collect the juice of which the pulque is made. They cut the bundle of central leaves and enlarge, insensibly, the wound, covering it with lateral leaves, which they raise by drawing them close and tying them at the extremities. In this wound the vessels appear to deposit all the juice which would have formed the colossal hampe loaded with flowers. This is a true vegetable spring that keeps running for two or three months, and from which the Indian draws three or four times a-day. We may judge of the quickness or slowness of the motion of the juice by the quantity of honey extracted from the maguey at different times of the day: a plant commonly yields, in twenty-four hours, 242 cubic inches, nearly equal to eight pints, of which three are obtained at sun-rise, two at mid-day, and three at six in the evening. A very vigorous plant sometimes yields about seven quarts, or 454 cubic inches, per day for from four to five months, which amounts to the enormous quantity of 67,130 cubic inches, supplied by a plant scarcely five feet in height.

The honey, or juice of the agave, is of a very agreeable sour taste. It easily ferments on account of the sugar and mucilage which it contains. To accelerate this fermentation they add, however, a little old and acid pulque. This operation is terminated in three or four days. The vinous beverage, which resembles cider, has an odour of putrid meat, extremely disagreeable; but Europeans who have been able to get over the aversion which this fetid odour inspires, prefer the pulque to any other liquor. They consider it as stomachic, strengthening, and especially as very nutritive; and it is recommended to lean persons.

A very intoxicating brandy is formed from the pulque, which is called *mexical* or *aguardiente de maguey*, and though the Spanish colonial government prohibited its use, as prejudicial to the Spanish brandy trade, such quantities of it were manufactured, that the whole importation of brandy into Mexico alone amounted to 32,000 barrels.

But the maguey is not only the wine of the Aztecs, it can also supply the place of the hemp of Asia, and the papyrus of the Egyptians. The paper on which the ancient Mexicans painted their hieroglyphical figures was made of the fibres of agave leaves, macerated in water, and disposed in layers like the Egyptian papyrus, and the mulberry of the South Sea Islands. M. Humboldt brought home with him several fragments of Aztec manuscripts written on maguey papers of a thickness so different that some of them resembled pasteboard, while others resembled Chinese paper. The thread which is obtained from the maguey is known in Europe by the name of pite thread, and is preferred by naturalists to every other, because it is less subject to twist. The juice which the agave yields, when it is still far from the period of efflorescence, is very acid, and is successfully employed as a caustic in the cleansing of wounds. The prickles which terminate the leaves served formerly, like those of the cactus, for pins and nails to the Indians.



[Agave.]

⁎ The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

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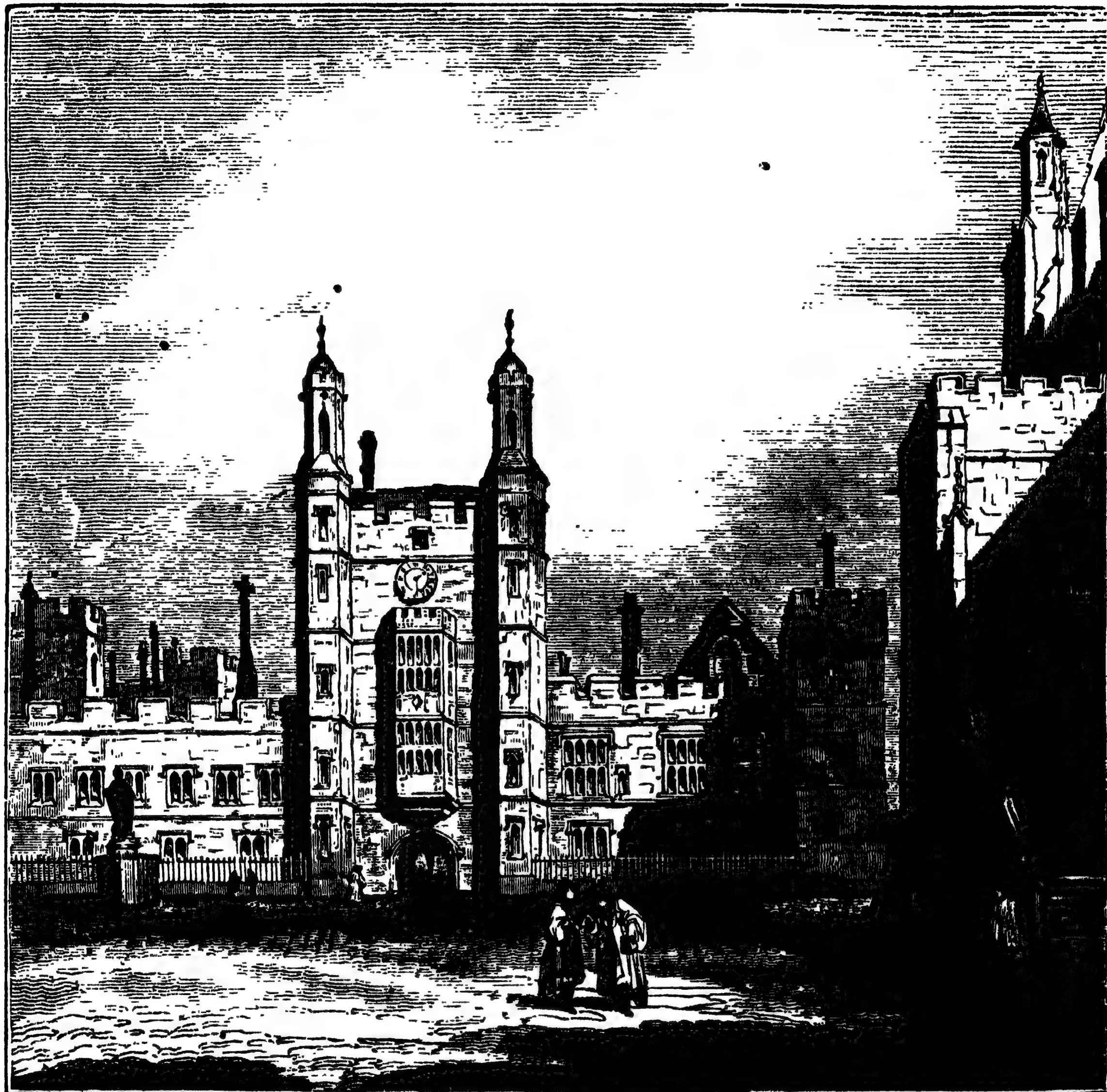
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ETON COLLEGE.



[Quadrangle of Eton College.]

Of our three great public schools, Eton, Westminster, and Winchester, the first has always been considered to hold the highest rank. It is the only one of the three to which it is usual to give the name of a College. It is, we believe, the richest foundation of the three.

Windsor and Eton, though situated on opposite sides of the Thames and in different counties, form in appearance only one town. The bridge over the river is the only interruption to the line of houses. At the farther extremity of the town of Eton, and separated from it, stands the college. The buildings of this institution,—the

———" antique towers,
That crown the watery glade,"

show best from a distance, where they are set off by the natural beauties of their situation. They form a conspicuous and highly ornamental object in the splendid view from the terrace of Windsor Castle. Seen from their immediate neighbourhood, they are not very imposing. They consist of two quadrangles, built partly of freestone, but chiefly of brick, in a style somewhat resembling that of the north front of St. James's palace. In the one quadrangle are the school and the chapel, with the lodgings for the scholars; the other contains the library, the provost's house, and the apartments of the fellows. The chapel, which is built of stone, is the part in which the architecture is most ambitious; it is externally a handsome structure, though very plain in the interior. It is one hundred and seventy-five feet in length, including an ante-chapel which is sixty-two feet long. In the centre of the first-mentioned quadrangle stands a bronze statue of Henry VI. which was erected in the early part of the last century by Dr. Godolphin, the provost of the college. There is another statue of the same king in the chapel, the work of the late John Bacon.

Eton College was founded by Henry VI. The founda-

tion charter is dated at Windsor, on the twelfth of September, in the nineteenth year of his reign, that is, in the year 1440. The original establishment was a provost, ten priests, four clerks, six choristers, twenty-five poor grammar scholars, and the like number of poor men. It now consists of a provost, six other fellows, two schoolmasters, two conducts, seven clerks, seventy king's scholars, ten choristers, and a number of inferior officers and servants. Besides the scholars on the foundation, the school is always attended by a much larger number of others, called oppidans. The oppidans generally amount to between 300 and 400, and have exceeded 500.

From the seventy king's scholars a certain number are annually selected and put on a roll for admission to King's College, Cambridge. The election is made, after examination of the upper class, by the provost and two fellows of King's College, assisted by the provost, vice-provost, and head master of Eton. The successful candidates, however, are not immediately transferred to Cambridge, but remain at school until vacancies occur on the foundation of King's College. The supply is prevented from outrunning the demand by the regulation that at the age of nineteen an Etonian is superannuated, as it is called, or is not allowed to remain longer at school. On their removal to Cambridge the Eton scholars are received on the foundation of the college and maintained from its funds; and after three years they succeed to fellowships. Here then is an opportunity by which the poorest man's son may obtain the best education which the country affords, and be put on the road to the highest preferments in the national church. The admission to Eton is not clogged with any necessity for patronage; although the incidental charges attending the education of a king's scholar are greater than is compatible with the character of a charitable foundation.

Mr. Britton, in the second volume of his 'Architectural Antiquities of Great Britain,' has printed, from manuscripts in the British Museum, some accounts of the expenditure on the building of Eton College, which curiously illustrate wages and prices in former times. The work appears to have been commenced in the beginning of July, 1441. The first week there were employed seventeen carpenters, seven stone-masons, fifteen sawyers, and thirty-one common labourers. In the second week two more masons and twenty-five more labourers were added. By December we find thirty-five free masons and two row masons employed. The wages of masons and carpenters were sixpence a-day, and those of labourers two-pence. Many days were lost, however, both to the men and to the progress of the work, as being holydays of the church. The first year the entire expenditure was usually from £6 to £9 per week. The second year there was paid for labour alone £712 19*s*. 1*d*., and for materials £1447 4*s*. That year 457 tons of stone were imported from Caen, in Normandy, which appear to have been paid for at the rate of 5*s*. 8*d*. per ton at the quarry, 4*s*. more for carriage to London, and 1*s*. 4*d*. more for carriage to Eton: the total cost, therefore, was 11*s*. per ton. Most of our old buildings, we may remark, from the Conquest down to the end of the fifteenth century, were constructed of stone from Caen. The portion of Eton College which is of brick was not begun till 1443. That year 100,000 bricks were used, which cost 10*d*. the thousand. In five years there were consumed 1,637,750 bricks. The brick-kiln was near Slough, in a field now the property of the College, but which was then rented at twenty shillings per annum. The building suffered considerable interruptions before it was completed; and the great tower gateway, indeed, called Lupton's Tower, which was the last part erected, was not finished till the year 1523, in the reign of Henry VIII.

THE ICELANDERS.—No. 1.

In a recent Number of our Magazine an allusion was made to the love of reading and civilization common to the inhabitants of the poor and sterile island of Iceland. We now propose to give a short account of that interesting people, who, under almost every physical disadvantage, attained the inestimable advantages of general civilization at an earlier period than any of the more favoured nations of modern Europe.

A glance at the map will sufficiently explain the geographical position of Iceland, lying far to the north of the Shetland and the Ferro Isles, within two hundred miles of Greenland. The first discovery of the island, authenticated by history, was made about the year 860, by some adventurous Norwegian and Swedish rovers. At that time Norway was a separate state, governed by a king of its own. Its inhabitants were a branch of the great Teutonic family. About fourteen years after the discovery of Iceland, the reigning sovereign of Norway made encroachments on the freedom of his subjects. To these many would not submit, preferring rather to emigrate to the uninhabited and unfruitful island. The first colony took possession of part of the coast of Iceland, about the year 875. Soon afterwards the same love of liberty drove other Norwegians to the same stormy shores, and in the course of a few years the strength of the infant state was further increased by many families of Danes and Swedes, and by a few Scotch and Irish emigrants. The Icelandic historians have carefully preserved the names of these Scotch and Irish.

There are some grounds for believing that the climate of Iceland was then somewhat less inclement then now, but it is to be doubted whether corn ever grew there. Many parts of the island, however, when not covered with snow, offered good pasturage; and the surrounding sea teemed with fish of various sorts, from the herring to the whale, which not only furnished food, but oil to enliven the gloom of the long, dark winter of the new settlers. At their first settlement the Icelanders were only shepherds and fishermen. In this condition, and long before numerous concurrent circumstances produced such a system in any other part of Europe, the Icelanders formed a representative government. The possession of property gave any man a vote: by mental attainments and moral conduct any free man could aspire to civil influence and dignity in the state; but by degrees many of the chief offices were made hereditary in families of ancient or celebrated lineage, and a somewhat exclusive aristocracy was established. Beyond the circle of government, however, the rights of every free Icelander were most scrupulously respected. The Althing, or national assembly, met every year on the shores of the lake Thingvalla, and there, in the open air, deliberated on the measures to be adopted for the common good. A Laugman, or president, in whom was vested the executive power, was elected, and displaced at the pleasure of the assembly.

During the summer months, these hardy men tended their flocks, tilled patches of the rude soil of the island, and fished in the stormy sea; but winter brought a long season of darkness and necessary repose. To lighten the tedium of that oppressive season, they recited to their families assembled round the fire and the lamp, the descent and noble deeds of their ancestors, and described in Runic verse the lands whence they had come to Iceland in pursuit of freedom.

They had brought with them this love of genealogy and poetry, which was indeed common to the Norwegians, Danes, and all the Teutonic tribes; but in the sunless winters of Iceland, where they had scarcely any other amusement or resource, they indulged in it far more than they had done when occupying a happier climate. The effect of this was seen in the improvement

of their poetry and their chronicles. In course of time, this excellence was rumoured abroad, and the skalds, or bards of Iceland, were invited to foreign courts. The princes of England, Ireland, Sweden, Denmark and Norway, after entertaining them most honourably, dismissed them with wealth. "Thus," says Dr. Holland, "literature became with the Icelanders a species of commerce, in which the fruit of their mental endowment was exchanged for those foreign luxuries or comforts which nature had denied to them from their own soil *." As fishermen, the Icelanders were bold sailors; seamen were necessary to carry the skalds to the distant courts, and in this service their nautical skill was enlarged. Soon after, traders went in the train of the poets, and thus obtained for the island the advantages of an increased and increasing foreign commerce.

In the year 1000, these interesting people were converted to Christianity. About fifty years after, their first bishop founded their first school or college, and then the Roman alphabet was substituted for the rude and defective Runic characters. Three other schools soon followed, and the monasteries, which were now first erected, were so many places of education. During the latter half of the eleventh and the whole of the twelfth century, the Latin classics were diligently taught in these seminaries; and some of the poor, remote Icelanders even studied Greek. The mechanical sciences, mathematics, and astronomy, of which they felt the want in proportion as they extended their maritime adventures, were also cultivated with assiduity.

In the middle of the thirteenth century, numerous jealousies and dissensions having broken out among the chief aristocratic families, the island was, by agreement, transferred to the Norwegian Kings. In 1380, Norway itself ceased to be an independent kingdom: it was annexed to Denmark, and Iceland went with it. Both these transfers seem to have been effected without any violent shock, and to have produced few and very slight changes in the laws and government of the country. It was owing to circumstances entirely foreign to these political changes that Iceland lost her literary supremacy, which had been almost a monopoly in the north of Europe. The fact was simply this,—other countries had awakened from their sleep of barbarism, and begun to cultivate letters and sciences.

In 1402, a dreadful plague carried off two-thirds of the inhabitants of Iceland; this calamity was followed by a winter so severe, that not one-tenth part of their cattle survived it, and this loss again was followed by the depredations of certain barbarous English pirates. There was a consequent depression both in the moral and physical state of these unfortunate islanders, but neither then nor at any other period did they relapse into indolence and ignorance.

They struggled manfully with the evils that beset them, persevering in an enlightened system of internal policy, in liberal methods of education, and in a quiet, steady line of moral, blameless conduct.

The Icelanders received their first printing press in 1530, and the reformation of their religion soon followed its introduction. Their types were at first made of wood, and very rudely formed. In 1574, one of their bishops made great improvements in the printing establishment, providing new presses and types, some of which he made with his own hands. Before the conclusion of the sixteenth century, many valuable books, well printed, were published and sold through the country.

The rough, unpromising coasts of the island continued to be visited by pirates. As late as 1616 they suffered much from certain English and French freebooters, who must indeed have been monsters to plunder a people at once so poor and so inoffensive. A still heavier calamity befell them in 1627, when some Algerines found their way to this remote island, and landing on the southern coast, committed the greatest atrocities. This is one of the saddest pages in the history of the simple, yet enlightened Icelanders. Forty or fifty of them were butchered, and nearly four hundred of both sexes were carried off to the Mediterranean and sold as slaves. Nine years after, when the King of Denmark obtained their liberty by ransom, only thirty-seven of the four hundred were found alive, and of these thirty-seven only thirteen ever reached their native land.

* Inserted in Sir George Steuart Mackenzie's 'Travels in Iceland.'

In Iceland the eighteenth century was ushered in by a dreadful mortality from small-pox, and about fifty years later, above ten thousand deaths were occasioned by a famine. In 1783, volcanic eruptions, more terrific than had ever been seen, burst out in every direction. Deep rivers were filled up by lava; the cattle and the pastures were every where destroyed, and for more than a year a dense cloud of smoke and volcanic ashes covered the whole of the island. Even the sea was contaminated; the fisheries were destroyed, nor have they yet entirely recovered from the effects of those mighty convulsions. Famine and the small-pox following in the track of this desolation, destroyed a fourth part of the population. The island had scarcely begun to breathe from these calamities, when, as a dependence of Denmark, it found itself involved in the miseries of the last war, and saw its commerce, now indeed limited, but absolutely necessary to the existence of its inhabitants, interrupted by the powerful navy of Great Britain.

To the honour of our government, they sent instructions to our cruizers to respect, and in no ways molest, the inhabitants of the Ferro Islands, who were in a situation even worse and more helpless than that of the Icelanders; at a later period they even granted licenses to ships to trade with Iceland.

Few countries have ever been visited by such a series of misfortunes as this, and yet between 1650 and 1810, Iceland produced from two to three hundred respectable authors.

[To be concluded in the next Number.]

THE MOCKING-BIRD.

(Abridged from Wilson's 'American Ornithology.')

This celebrated and very extraordinary bird, which, in extent and variety of vocal powers, stands unrivalled by the whole feathered songsters of America or perhaps any other country, is peculiar to the New World; and inhabits a very considerable extent of both North and South America, having been traced from the States of New England to Brazil, and also among many of the adjacent islands. They are, however, much more numerous in those States south than those north of the river Delaware; being generally migratory in the latter, and resident (at least many of them) in the former. A warm climate, and low country not far from the sea, seems most congenial to their nature; the species are accordingly found to be less numerous to the west than east of the great range of Alleghany, in the same parallels of latitude. In these regions the berries of the red cedar, myrtle, holly, many species of smilax, together with gum berries, gall berries, and a profuse variety of others, abound, and furnish them with a perpetual feast. Winged insects also, of which they are very fond and very expert in catching, are there plentiful even in the winter season.

The precise time at which the mocking-bird begins to build his nest varies according to the latitude in which he resides, from the beginning of April to the middle of May. There are particular situations to which he gives the preference. A solitary thorn-bush, an almost

impenetrable thicket, an orange-tree, cedar, or holly-bush, are favourite spots and frequently selected. It is no great objection to the bird that a farm or mansion-house happens to be near; always ready to defend, but never over-anxious to conceal, his nest, he very often builds within a small distance of the house, and not unfrequently in a pear or apple-tree, rarely at a greater height than six or seven feet from the ground. The nest varies a little according to the conveniency of collecting suitable materials. Generally it is composed of, first, a quantity of dry twigs and sticks, then withered tops of weeds of the preceding year, intermixed with fine straw, hay, pieces of wool and tow; and, lastly, a thick layer of fine fibrous roots, of a light brown colour, lines the whole. The female sits fourteen days, and generally produces two broods in the season, unless robbed of her eggs, in which case she will even build and lay the third time. She is, however, very jealous of her nest, and very apt to forsake it if much disturbed.

During the period of incubation, neither cat, dog, animal nor man can approach the nest without being attacked. The cats, in particular, are persecuted whenever they make their appearance, till obliged to retreat. But his whole vengeance is more particularly directed against that mortal enemy of his eggs and young, the black snake. Whenever the insidious approaches of this reptile are discovered, the male darts upon it with the rapidity of an arrow, dexterously eluding its bite and striking it violently and incessantly about the head, where it is very vulnerable. The snake soon becomes sensible of its danger, and seeks to escape; but the intrepid defender of his young redoubles his exertions, and, unless his antagonist be of great magnitude, often succeeds in destroying him. All his pretended powers of fascination avail it nothing against the vengeance of this noble bird. As the snake's strength begins to flag, the mocking-bird seizes and lifts it up partly from the ground, beating it with its wings, and when the business is completed, he returns to the nest of his young, mounts the summit of the bush, and pours forth a torrent of song in token of victory.

The mocking-bird is 9½ inches long and 13 across when its wings are spread. Some individuals are, however, larger and some smaller, those of the first hatch being uniformly the largest. The upper parts of the head, neck, and back, are a dark brownish ash, and when new moulted, a fine light grey; the wings and tail are nearly black, the first and second rows of coverts tipped with white; the primary, in some males, are wholly white, in others tinged with brown. The three first primaries are white from their roots as far as their coverts; the white on the next six extends from an inch to one and three-fourths farther down, descending equally on each side the feather; the tail is cuneiform; the two exterior feathers wholly white, the rest, except the middle ones, tipped with white; the chin is white; sides of the neck, breast, belly, and vent, a brownish-white, much purer in wild birds than in those that have been domesticated; iris of the eye, yellowish-cream coloured, inclining to golden; bill black; the base of the lower mandible whitish; legs and feet black and strong. The female much resembles the male, and is only distinguishable by the white of her wings being less pure and broad, and her black feathers having a more rusty hue.

It will be seen from this description, that though the plumage of the mocking bird is none of the homeliest, it has nothing gaudy or brilliant in it; and, had he nothing else to recommend him, would scarcely entitle him to notice. But his figure is well proportioned and even handsome. The ease, elegance, and rapidity of his movements, the animation of his eye, and the intelligence he displays in listening and laying up lessons, from almost every species of the feathered creation within his hearing, are really surprising, and mark the peculiarity of his genius. To these qualities may be added that of a voice full, strong, and musical, and capable of almost every modulation, from the clear, mellow tones of the wood-thrush to the savage scream of the bald eagle. In measure and accent he faithfully follows his originals; in force and sweetness of expression he greatly improves upon them In his native groves, mounted on the top of a tall bush or half-grown tree, in the dawn of the morning, while the woods are already vocal with a multitude of warblers, his admirable song rises pre-eminent over every competitor. The ear can listen to his music alone, to which that of all the others seems a mere accompaniment. Neither is his strain altogether imitative. His own native notes are bold and full, and varied seemingly beyond all limits. They consist of short expressions of two, three, or, at the most, five or six syllables, generally interspersed with imitations, and all of them uttered with great emphasis and rapidity, and continued with undiminished ardour for half an hour or an hour at a time. His expanded wings and tail, glistening with white, and the buoyant gaiety of his action, arresting the eye as his song most irresistibly does the ear, he sweeps round with enthusiastic ecstasy, and mounts and descends as his song swells or dies away. While thus exerting himself, a bystander, destitute of sight, would suppose that the whole feathered tribes had assembled together on a trial of skill, each striving to produce his utmost effect. He often deceives the sportsman, and sends him in search of birds that are not, perhaps, within miles of him, but whose notes he exactly imitates: even birds themselves are frequently imposed upon by this admirable mimic, and are decoyed by the fancied calls of their mates, or dive with precipitation into the depth of thickets at the scream of what they suppose to be the sparrow-hawk.

The mocking-bird loses little of the power and energy of his song by confinement. In his domesticated state, when he commences his career of song, it is impossible to stand by uninterested. He whistles for the dog; Cæsar starts up, wags his tail, and runs to meet his master. He squeaks out like a hurt chicken, and the hen hurries about with hanging wings and bristled feathers, chuckling to protect its injured brood. The barking of the dog, the mewing of the cat, the creaking of a passing wheelbarrow, follow with great truth and rapidity. He repeats the tune taught him by his master, though of considerable length, fully and faithfully;—he runs over the quaverings of the canary, and the clear whistlings of the Virginia nightingale, or red-bird, with such superior execution and effect that the mortified songsters feel their own inferiority, and become altogether silent, while he seems to triumph in their defeat by redoubling his exertions.

This excessive fondness for variety, however, in the opinion of some injures his song. His elevated imitations of the brown thrush are frequently interrupted by the crowing of cocks; and the warblings of the blue-bird, which he exquisitely manages, are mingled with the screaming of swallows or the cackling of hens. Amidst the simple melody of the robin one is suddenly surprised by the shrill reiterations of the whip-poor-will, while the notes of the kildeer, blue-jay, martin, Baltimore, and twenty others, succeed, with such imposing reality, that the auditors look round for the originals, and with astonishment discover that the sole performer in this singular concert is the admirable bird now before us. During this exhibition of his powers, he spreads his wings, expands his tail, and throws himself around the cage in all the ecstasy of enthusiasm, seeming not only to sing but to dance, keeping time to the measure of his own music. Both in his native and domesticated state, during the stillness of the night, as soon as the moon

rises, he begins his delightful solo, making the whole neighbourhood resound with his inimitable medley.

The mocking-bird is frequently taken in trap-cages, and, by proper management, may be made sufficiently tame to sing. The usual price of a singing-bird is from seven to fifteen, and even twenty dollars. Mr. Wilson has known fifty dollars paid for a remarkably fine singer; and one instance where one hundred dollars were refused for a still more extraordinary one. Attempts have been made to induce these charming birds to pair, and rear their young in a state of confinement, and the result has been such as to prove it, by proper management, perfectly practicable.



[The Mocking-Bird.]

A WELL-CONDUCTED FACTORY.

(*From a Correspondent.*)

The general tenour of the evidence given before the Factory Commissioners goes to show that, although there may be great abuses in many establishments in which children are employed, extensive factories may, and do, exist where the light spirits of youth are still buoyant and unbroken by undue labour and restraint, and where the industry of the young not only contributes to the increase of our national wealth, but also to their own advantage. In many factories they are not only usefully employed, but, at the same time, are trained up in those habits of morality and good feeling which are most likely to ensure their own lasting happiness and to make them valuable members of society.

We have recently returned from visiting many such factories, and, among the rest, that of Mr. John Wood, jun., a stuff manufacturer of Bradford, in Yorkshire. We think it may do some good, in two ways, if we give a very slight sketch of what we there saw. Such an outline may serve to correct some of the prejudices which exist on the subject of factories generally, amongst those who have never visited the seats of our great manufactures; while those masters (we hope they are but few) who look only to the accumulation of money by the employment of children, may take shame to themselves when they find that the same object may be attained without injury to their health or morals.

In the manufactory of Mr. Wood about six hundred persons, principally girls, are employed. When we arrived it was the hour allotted to dinner and recreation; and the young people were joyously sporting in the open yard of the factory, like children out of school. After witnessing for some time this scene of unrestrained freedom from toil, the period for renewed industry arrived, and we were ushered into the mill. This we found as clean, as light, and as comfortable as a drawing-room, or rather as a series of drawing-rooms, for there are several floors filled with machinery. The children, in resuming their work, had not lost their cheerful look, but set about their tasks in a manner which proved that these were any thing but irksome to them. Seats are provided for the accommodation of the young folks when they are not actually employed, which state of leisure, from the nature of their occupation, very frequently occurs. The little work-people seemed quite delighted to see their employer; their faces brightened up, and their eyes sparkled as he came near and spoke to them; indeed he appeared to be more like a father among them, and an affectionate one too, than like a master; patting them on the head, chucking them under the chin, and addressing them according to their ages.

There is always a surplus number of children in the mill, in order that they may be sent by instalments to a school-room on the premises, where they learn to knit and to sew, as well as to read and to write. The reason given by their benevolent employer for having them taught knitting and needle-work shows how mindful he is of their future welfare. He had found that when girls, who had been employed from an early age in a mill,

were married, they made unprofitable wives, (from not knowing how to perform the necessary parts of a wife's and a mother's duties—they did not know how to employ themselves, and consequently became idle gossips. A schoolmaster resides on the premises, and Mr. Wood allows other poor children, besides those employed in his own mill, to attend the school. A medical man is engaged to visit the factory weekly to examine into the general health of the children, besides which he gives more frequent attendance to those who may be ill.

With regard to the hours of work, the Factory Bill recently passed will just make a difference of ten minutes during the day in the time of their employment. The children are expected to appear in clean clothes twice a week; Saturday is the worst day in the week in this respect, and on that day some of the young people are employed in cleaning the place. It happened to be on a Saturday that we viewed the factory, and therefore not at the most favourable time: the young folks do not like visiters on that day, and there was in consequence some slight scruples at admitting us; but every one and everything appeared to us nice, clean, and in order, and we could not detect among the children any signs that the renewed cleanliness of the morrow was required. We questioned the proprietor as to the morals of the older girls, when he assured us that they are perfectly good, and added that he was certain if any one among them was known to misconduct herself, the rest would immediately apply to him to dismiss her from among them. Mr. Wood never found any difficulty in training the children according to his wishes; at first he had some trouble in inducing the parents to co-operate with him in his plans, but this obstacle to improvement is now entirely overcome.

Mr. Wood is a wool-sorter and wool-comber, as well as a spinner; and in those branches employs men of some skill, who appeared to be very decent: not one did we see who bore the marks of vice or drunkenness about him. They seemed to be on the best of terms with their employer. Whenever he entered any room where they were at work, he addressed them with "Good morning, how do you all do?" which was answered by an inquiry about his health, and an addition in one or two cases of, "It is some days since we have seen you, Sir." In fact, all seemed glad to see him, as if it were felt and fully recognized that his was the grateful task to watch over and promote the general good, and that only one common interest existed between them. Happy is it for society when the employer and the employed have such a connexion of mutual good-will between them, and most happy are those who can combine with their own gainful pursuits the gratification which always accompanies warm-hearted and enlightened benevolence.

REMEMBRANCE.

Man hath a weary pilgrimage
  As through the world he wends;
On every stage from youth to age
  Still discontent attends;
With heaviness he casts his eye
  Upon the road before,
And still remembers, with a sigh,
  The days that are no more.

To school the little exile goes
  Torn from his mother's arms;
What then shall sooth his earliest woes,
  When novelty hath lost its charms?
Condemn'd to suffer through the day
Restraints which no rewards repay,
  And cares where love has no concern,
Hope lengthens as she counts the hours,
  Before his wish'd return.
From hard control and tyrant rules,
The unfeeling discipline of schools,
  In thought he loves to roam,
And tears will struggle in his eye
While he remembers with a sigh
  The comforts of his home.

Youth comes; the toils and cares of life
  Torment the restless mind;
Where shall the tired and harass'd heart
  Its consolation find?
Then is not youth, as fancy tells,
  Life's summer prime of joy?
Ah no! for hopes too long delay'd,
And feelings blasted or betray'd,
  The fabled bliss destroy;
And youth remembers with a sigh
The careless days of infancy.

Maturer manhood now arrives,
  And other thoughts come on,
But with the baseless hopes of youth
  Its generous warmth is gone;
Cold calculating cares succeed,
The timid thought, the wary deed,
  The dull realities of truth;
Back on the past he turns his eye,
Remembering with an envious sigh
  The happy dreams of youth.

So reaches he the later stage
Of this our mortal pilgrimage,
  With feeble step and slow;
New ills that later stage await,
And old experience learns too late
  That all is vanity below.
Life's vain delusions are gone by,
  Its idle hopes are o'er,
Yet age remembers with a sigh
  The days that are no more.

Southey.

TOWN OF YPRES.

Ypres, or Ypern (for that is the Flemish name), is not now what it was of old; but it is still a considerable town, and it retains numerous memorials of its former greatness, in the public buildings with which it is crowded. It still ranks with Bruges and Ghent as one of the three chief towns of Flanders, and its population is believed to amount to about fifteen thousand inhabitants. It stands on a stream called the Yper, which flows through it from south to north, and then makes its way to the sea, into which it falls about midway between Dunkirk and Ostend. This stream descends from some grounds of very moderate elevation, a few miles from the town; the rest of the country around which is nearly a complete flat, like the greater part of the Netherlands. In this situation the town is seen from a considerable distance, and makes a handsome appearance as it rises in the midst of the plain, with its embattled walls, and its throng of spires. The extent of the present walls is not quite four English miles, making a circle of about a mile and a quarter in diameter. The surrounding country is remarkably rich and beautiful, part of it being woodland, and the rest consisting of green meadows and corn-fields, everywhere interspersed with orchards, gardens, and villages.

The pride of Ypres is its Town Hall, which stands near the centre of the town in a large open space, called the great market-place. It is a magnificent building, surrounding a quadrangular space, measuring four hundred and sixty-two feet from east to west, and fifty in the opposite direction, here divided into two courts by a pile of building which crosses its centre. From the middle of the south front rises a lofty square tower, in which are a clock and bells, and which bears the appearance of being still more ancient than the rest of the building. The erection of the hall is said to have been begun in 1342, and in popular tradition the work is attributed to the English, who certainly, however, were not in possession of the place either then or at any other period. The notion seems to have originated merely in the great fame which the English had acquired in these parts by their warlike achievements, and which made them be regarded as the authors of every thing wonderful, in the same way as in our own country we still attribute many old buildings, the origin of which is forgotten, to Cæsar and the Romans. We have

another vestige of this popular veneration for the memory of the English in the tradition which deduces the name of the city itself from a celebrated British warrior, called Iper, who is imagined to have built and colonized it. We do not know if there is any more truth than there usually is in these idle stories, in a statement which Antonius Sanderus makes respecting this Town Hall, in his splendid work entitled 'Flandria Illustrata.' He says that there never has been seen in it either a spider or a cobweb; and he accounts for the circumstance, by imputing it, not to the superior dusting and scrubbing of his countrymen, but to some supposed quality in the wood.

The building next to the Town Hall, which is most deserving of attention in Ypres, is the Cathedral, which stands in its neighbourhood. This is a light and elegant Gothic structure, more remarkable, however, for its decorations than for its dimensions. Besides the Cathedral, which is dedicated to St. Martin, Ypres contains four parish churches, of which that of St. James the Greater, built in the twelfth century, is the largest. There are also numerous religious houses for both sexes. About a century ago fully a third of the city used to be covered with the buildings belonging to these establishments.

The city of Ypres, however, is more interesting on account of what it formerly was than for what it now is. It still contains some manufactures of cloth, serges, ribands, and thread; but at one time its inhabitants appear to have formed the greatest manufacturing community in the world. A census of the population taken in 1342, made it amount to above two hundred thousand souls. Soon after this, however, its decline began. In a French edition of Ludovico Guicciardini's 'Description of the Low Countries,' published at Antwerp, in 1609, it is remarked, that whensoever and in what quantity soever the rain of adversity had in former days fallen upon Ghent and Bruges, Ypres had always received some drops of it; and that this city, indeed, being the weakest of the three, had often been severely punished, and obliged to pay the forfeit for misdeeds which the other two had committed. All these towns suffered both by the attacks of foreign enemies and by their own internal dissensions. The middle of the fourteenth century was in the Netherlands, as in France and in England, the age of political convulsion—of the first considerable efforts, since the establishment of feudal institutions, made by the body of the people to throw off the oppressive yoke under which they were everywhere kept down. Some contemporary writers attribute these tumults of the commonalty to the improvement which had now taken place in their condition, as compared with that of their forefathers; and there can be no doubt that there is much truth in this representation. As long as the condition of the people was one of almost brutal destitution and misery, they submitted to be treated like the inferior animals; but as they gradually outgrew this absolute penury and helplessness, they became more indisposed to endure the oppression to which they were subjected, and began first to murmur against it, and then attempt to throw it off. The attempt, as was to be expected, was not skilfully directed in the first instance, and was productive of no immediate good effects; but it prepared the way for future and more successful struggles. It served at least as an example, and, that once given, the rest followed of course.

For this leading step in the onward march of civilization, we are mainly indebted to the citizens of Ypres and other Flemish towns. The cloth-weavers of these towns were the first commonalty in Europe that became, to a certain extent, independent of their feudal lords, and acquired a degree of inherent power and importance by means of manufactures and trade. They were accordingly the first to rise in extensive and formidable concert against the system of misrule by the grandees and lords of the soil which then universally prevailed. And from the Netherlands the movement was propagated into other countries. English liberty in particular is probably much indebted to these sturdy burghers. To us they gave much more than their example. Edward III. brought over to England large numbers of these cloth-workers from the Netherlands, who settling here, communicated to our labouring classes their own arts and habits of industry, and may also be supposed to have transmitted and diffused that new spirit of liberty which had principally induced them to leave the land of their birth. Elizabeth also, long after again increased the population of this island by opening her ports to those mechanics of the Low Countries who were driven abroad, in her day, by the tyrannical conduct of the Spanish government of that province, as administered by the notorious Duke of Alva.

The first insurrection of the Flemings, however, against their princes, was, as we have observed, attended with very disastrous results to Ypres and the other towns, whose inhabitants engaged in it. "Before the commencement of these wars in Flanders," says Froissart, in commencing his account of the attempt made by the people, in the latter part of the fourteenth century, to restrain the oppressions of their governors, "the country was so fertile, and everything in such abundance, that it was marvellous to see, and the inhabitants of the principal towns lived in very grand state." But the war laid all this prosperity waste. "The people," he says, "were very murderous and cruel, and multitudes were slain or driven out of the country. The country itself was so much ruined, that it was said a hundred years would not restore it to the situation it was in before the war*."

This war was left for some time at first to rage between the Earl of Flanders and his insurgent subjects, who, according to an old custom of the country, having chosen themselves leaders, assumed the name of White-hoods. At length, however, the French king, Charles VI., struck in, to the aid of his brother potentate; and although the rebels had been hitherto successful at every point, this interference speedily turned the scale. The following is the account which Froissart gives of the submission of the city of Ypres to the powerful force which the Earl was now enabled to bring against it:—

"As soon as the citizens of Ypres learned that the Earl was on his march thither with such a force, they were greatly alarmed; and the principal and richest inhabitants held a council, in which they resolved to open their gates, and go out to meet him, with offers to replace themselves under his obedience, trusting to his mercy. It was well known to him that they had allied themselves with Ghent through fear of the lower ranks, such as weavers, fullers, and other ill-intentioned people of the town; they besides depended on his kind and merciful character for their pardon. As they had resolved, so did they execute; and upwards of three hundred in a company went out of the town, carrying the keys of the gates with them. On meeting the Earl of Flanders they fell on their knees, and begged for mercy, saying, that they personally, and the whole town, resigned themselves to his will. The Earl took pity on them, made them rise, and granted them his pardon. He entered the town of Ypres with his whole army, and remained there for three weeks, sending back those of the Franc and of Bruges to their several towns. During his residence in Ypres, he had upwards of seven hundred weavers and fullers beheaded; and all those who had been any way concerned in admitting John Lyon and the Ghent men into the town, who had slain the knights and men-at-arms whom he had sent thither, and which

* We quote from the English translation by Johnes.

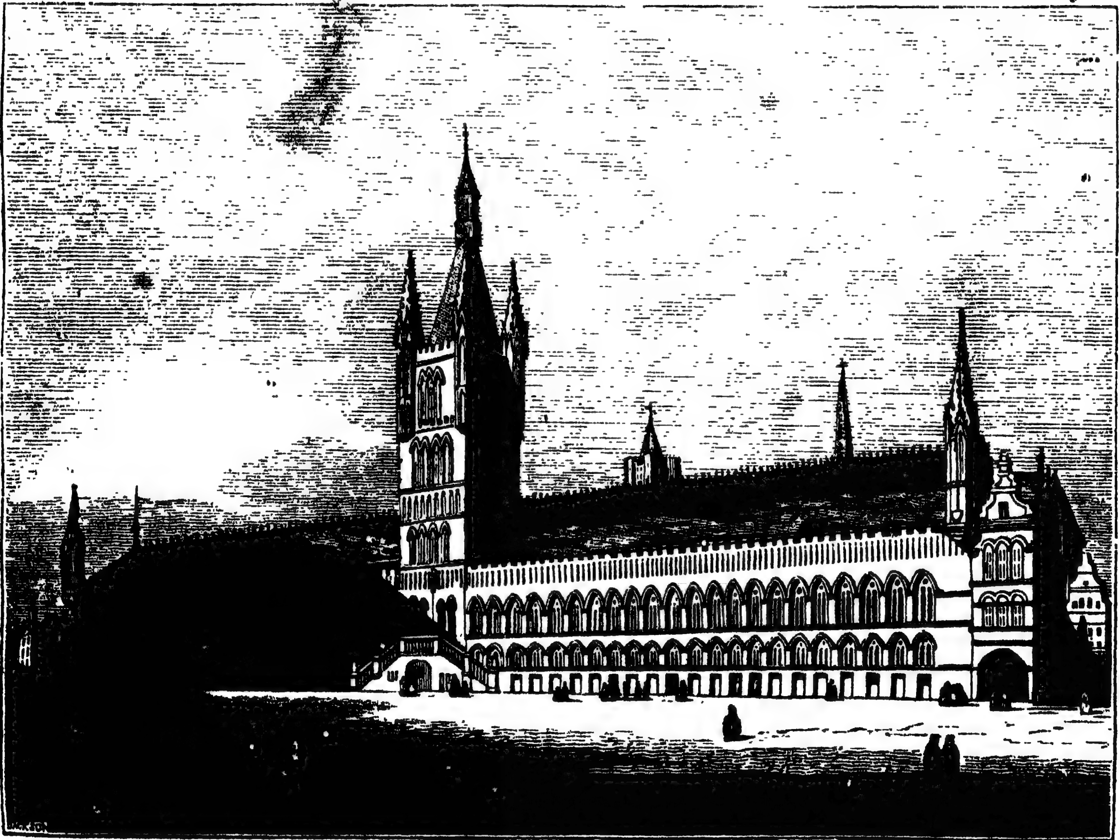
had enraged him so much. To prevent them again rebelling against him, he sent three hundred of the principal inhabitants to prison in Bruges, escorted by a handsome body of men-at-arms."

But these successes of the Earl of Flanders and his ally, the king of France, soon aroused a strong feeling of hostility against France in England. Froissart attributes this to envy.

However this may be, Lord Henry Spencer, Bishop of Norwich, having been about this time appointed by Pope Urban VI. commander-in-chief for England, of what was called a crusade in the interest of that pope against his rival Clement IV., and having as such been placed at the head of a formidable force, he and his troops embarked for the continent, and landed at Calais on the 23rd of April, 1383. A consultation was then held by the leaders with the object of determining in what direction they should next proceed; when it was resolved that the expedition should march into Flanders.

They then sent to the insurgents in Ghent for their aid. —" When Peter du Bois, Peter le Nintre, and the captains in Ghent," continues the historian, " heard that the English demanded their assistance, and were lying before Ypres, they were much pleased, and prepared themselves to march thither as speedily as possible. They set out from Ghent on the Saturday morning after the octave of St. Peter and St. Paul, to the amount of near twenty thousand, with a very considerable train of carts, and in good array. They marched by Courtray, and came before Ypres. The English were rejoiced at their coming, and made great cheer for them, saying they would take Ypres, and then conquer Bruges, Damme, and Sluys, making no doubt that before September they would have conquered all Flanders. Thus did they boast of their good fortune."

The issue, however, was very mortifying. " It always happens," says Froissart, " that in war there are gains and losses: very extraordinary are the chances, as those know well who follow the profession. The siege of Ypres was pushed on with unwearied force; and it was fully the intention of the Bishop of Norwich, the English, and Peter de Bois, to conquer Ypres by storm or otherwise, as the vigour of their attacks showed." But all their assaults being attended with no result, they resolved to adopt a new plan of operations. Froissart continues, " The English and Flemings, finding they could not take the town by storm, and having expended much of their artillery, resolved to have quantities of faggots made and collected, with which and earth they would fill up the ditches, so that they might advance to fight hand to hand with the garrison, undermine the walls, and, by throwing them down, win the place." Before this expedient could be executed, however, news was brought that the King of France was advancing with a powerful body of troops; and on receiving this intelligence, the bishop and his captains thought it best upon the whole to endeavour to make their escape as fast as they could. They reached home, and also contrived to carry with them a good deal of booty; but they were not thought to have brought much honour back from their campaign. " When these knights," the historian tells us, " returned to England, they were attacked by the common people, who told them they had behaved very badly in their expedition, for, from the prosperity they had had at the beginning, they ought to have conquered all Flanders."



[South Front of the Town Hall of Ypres.]

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THE CHAMOIS.

(Abridged from 'Menageries,' Vol. I.)



[Hunting the Chamois.]

The chamois inhabits the most inaccessible parts of the woody regions of the great mountains of Europe. Like the klipspringer of the Cape, he is remarkable for the wonderful extent and precision of his leaps. He bounds over the chasms of rocks—he springs from one projection to another with unerring certainty—he throws himself from a height of twenty or even thirty yards, upon the smallest ledge, where there is scarcely room for his feet to plant themselves. This extraordinary power of balancing the body—of instantly finding the centre of gravity,—is a peculiarity of all the goat tribe, to which the chamois is nearly allied. The ability of the eye to measure distances, with such undeviating exactness, is associated with this power of finding the centre of gravity. In the chamois these are instinctive faculties, which he possesses almost from the moment of his birth. They are not the result of training; for the young chamois has only to acquire the necessary strength to be able to imitate the feats of his more practised companions.

And yet man, by constant training, may attain an excellence in the employment of his senses very little inferior to the instinctive powers of the lower animals. The chamois hunters of the Alps are remarkable examples of what he may accomplish by courage, perseverance, and constant experiment. If man fairly bring his physical powers, and his mechanical aids, into a contest even with such surprising faculties as the chamois possesses, the triumph is his; and this triumph shows us that there are few things beyond the reach of human energy. The hunting of the chamois has been strikingly depicted in a work which unites the highest attainments of science, with an occasional display of the more common interest of picturesque description *.

The chamois hunter sets out upon his expedition of fatigue and danger generally in the night. His object is to find himself at the break of day in the most elevated pastures, where the chamois comes to feed before the flocks shall have arrived there. The chamois feeds only at morning and evening. When the hunter has nearly reached the spot where he expects to find his prey, he reconnoitres with a telescope. If he finds not the chamois, he mounts still higher; but if he discovers him, he endeavours to climb above him and to get nearer, by passing round some ravine, or gliding behind some eminence or rock. When he is near enough to distinguish the horns of the animal (which are small, round pointed, and bent backward like a hook, as in the above cut), he rests his rifle upon a rock, and takes his aim with great coolness. He rarely misses. This rifle is often double-barrelled. If the chamois falls, he runs

* Voyages dans les Alpes, par H. B. de Saussure. Tom. ii. § 736. Genève, 1786. 4to.

to his prey, makes sure of him by cutting the ham-strings, and applies himself to consider by what way he may best regain his village. If the route is very difficult, he contents himself with skinning the chamois; but if the way is at all practicable with a load, he throws the animal over his shoulder, and bears it home to his family, undaunted by the distance he has to go, and the precipices he has to cross.

But when, as is more frequently the case, the vigilant animal perceives the hunter, he flies with the greatest swiftness into the glaciers, leaping with incredible speed over the frozen snows and pointed rocks. It is particularly difficult to approach the chamois when there are many together. While the herd graze, one of them is planted as a sentinel on the point of some rock, which commands all the avenues of their pasturage;—and when he perceives an object of alarm, he makes a sharp, hissing noise, at the sound of which all the rest run towards him, to judge for themselves of the nature of the danger. If they discover a beast of prey or a hunter, the most experienced puts himself at their head, and they bound along, one after the other, into the most inaccessible places.

It is then that the labours of the hunter commence; for then, carried away by the excitement, he knows no danger. He crosses the snows, without thinking of the precipices which they may cover; he plunges into the most dangerous passes of the mountains—he climbs up, he leaps from rock to rock, without considering how he can return. The night often finds him in the heat of the pursuit; but he does not give up for this obstacle. He considers that the chamois will stop during the darkness as well as himself, and that on the morrow he may again reach them. He passes then the night, not at the foot of a tree, nor in a cave covered with verdure, as the hunter of the plain does, but upon a naked rock, or upon a heap of rough stones, without any sort of shelter. He is alone, without fire, without light; but he takes from his bag a bit of cheese, and some of the barley-bread, which is his ordinary food—bread so hard that he is obliged to break it between two stones, or to cleave it with the axe which he always carries with him to cut steps which shall serve for his ladder up the rocks of ice. His frugal meal being soon ended, he puts a stone under his head, and is presently asleep, dreaming of the way the chamois has taken. He is awakened by the freshness of the morning air; he rises, pierced through with cold; he measures with his eyes the precipices which he must yet climb to reach the chamois; he drinks a little brandy, (of which he always carries a small provision,) throws his bag across his shoulder, and again rushes forward to encounter new dangers. These daring and persevering hunters often remain whole days in the dreariest solitudes of the glaciers of Chamouni; and during this time, their families, and, above all, their unhappy wives, feel the keenest alarm for their safety.

And yet, with the full knowledge of the dangers to be encountered, the chase of the chamois is the object of an insurmountable passion. Saussure knew a handsome young man, of the district of Chamouni, who was about to be married; and the adventurous hunter thus addressed the naturalist:—"My grandfather was killed in the chase of the chamois; my father was killed also; and I am so certain that I shall be killed myself, that I call this bag, which I always carry hunting, my winding-sheet: I am sure that I shall have no other: and yet if you were to offer to make my fortune, upon the condition that I should renounce the chase of the chamois, I should refuse your kindness." Saussure adds, that he went several journeys in the Alps with this young man; that he possessed astonishing skill and strength, but that his temerity was greater than either; and that two years afterwards he met the fate which he anticipated, by his foot failing on the brink of a precipice to which he had leaped. It is the chase itself which attracts these people, more than the value of the prey; it is the alternation of hope and fear—the continual excitement—the very dangers themselves—which render the chamois hunter indifferent to all other pleasures. The same passion for hardy adventure constitutes the chief charm of the soldier's and the sailor's life; and, like all other passions, to be safe and innocent, it must be indulged in great moderation—near akin as it is to one of our most senseless and mischievous propensities, gambling.

The very few individuals who grow old in this trade bear on their countenances the traces of the life which they have led. They have a wild, and somewhat haggard and desperate air, by which they may be recognized in the midst of a crowd. Many of the superstitious peasants believe that they are sorcerers—that they have commerce with the evil spirit, and that it is he that throws them over the precipices. When the enormous glaciers and summits of Mont Blanc are beheld from the vallies, it is indeed almost miraculous that any mortal should be found hardy enough to climb them; and it is not unnatural that a simple peasantry should believe that something above human excitement had inspired these perilous undertakings. To the traveller, or to the native of the vale of Chamouni, Mont Blanc is an object of awe and astonishment; and the devotion of the instructed, and the superstition of the unenlightened, are perhaps equally attributes to the God of nature, when they thus look upon one of the grandest of natural objects—

"The dread ambassador from earth to heaven."

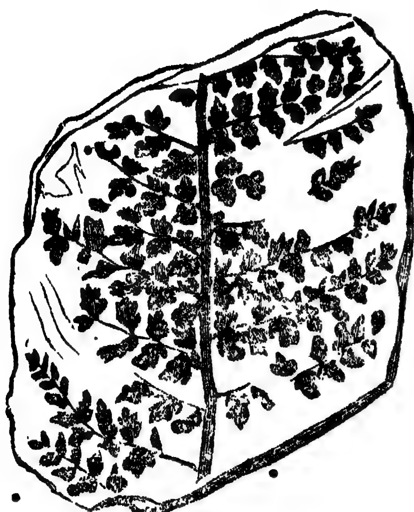
The chamois is now getting rare in Switzerland, in consequence of the inhabitants being allowed to hunt him at all seasons; but the race may be expected once more to multiply, as the old regulations for determining the periods of hunting are again introduced.

MINERAL KINGDOM.—Section 17.

COAL.

Origin of Coal.—If we examine a piece of this substance, particularly the fat, caking quality from Newcastle, we find it a compact, shining, stony body; but there are few fragments, even of a moderate size, in which we may not discover some parts very like charcoal, and very often with the distinct structure of wood or other vegetable matter. Such appearances are most frequently observed in the slaty coal of Staffordshire, Scotland, and other parts. Our knowledge of the nature of coal has been much advanced by an instrument new in mineral analysis, but which, in other departments of nature, has brought many hidden things to light. By an ingenious application of the microscope, Mr. Witham has exhibited a delicate cellular structure in fossil woods, which, without such aid, presents only the appearance of compact stone; and he has detected the same in coal, by subjecting extremely thin slices of it to this very highly magnifying power. His researches have been followed up by Mr. William Hutton, of Newcastle, who has thereby done much not only to elucidate the vegetable origin of coal, but to explain many chemical phenomena connected with it which were previously very little understood. Mr. Hutton states that, in all the varieties of coal found in the Newcastle coal-field, more or less of the fine, distinct, net-like structure of the original vegetable texture can always be discovered. The vegetable origin of coal is further illustrated by the vast quantities of fossil plants found in the sandstones and shales which are interstratified with the beds of coal. These are often in an extraordinary degree of preservation, for the most delicate leaves are spread out on the stone like the dried plants on the paper in the herbarium of a botanist. How perfectly

the forms are preserved the following specimen will show:—



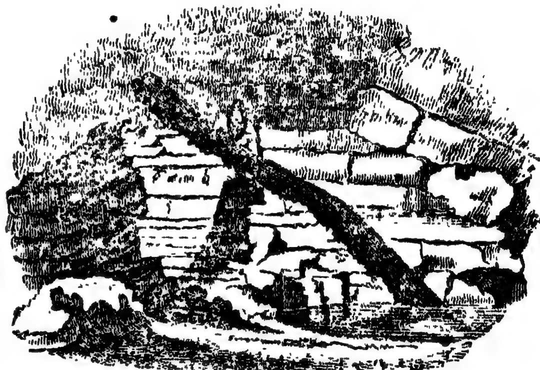
[Sphenopteris Trifoliolata.]

This plant belongs to the fern tribe, and the specimen is from the shale-beds of a coal-field in Silesia, in Germany; but others, quite as distinct in form, are common in the coal-fields of this country.

About three hundred different species of plants have been discovered in the coal-measures of this and of other countries, and of these fully two-thirds have a close resemblance to ferns. Among the rest, one of the kinds most frequently found belongs to that tribe of plants which botanists call the *equisetaceæ*, of which the weed so common in our ditches, known by the name of horse-tails, is an example; but while the stem of these rarely exceeds the diameter of a goose-quill, the fossil equiseta are sometimes as thick as a man's arm. Other fossil coal-plants resemble large reeds and canes; and bodies which appear to be fragments of the branches and stems of palms and other trees are of frequent occurrence. It is a remarkable circumstance, that no remains either of grasses or of mosses have yet been observed in the coal measures—plants which are not very often absent where vegetation is abundant, especially in moist situations; and the character of the whole fossil flora of the coal-fields shows, that the plants must have grown in marshy or humid ground. These terrestrial plants are never mixed with any of those which grow in the sea. It is a very striking fact, too, that they are generally of such a size as to indicate a degree of luxuriance of growth that is now known to exist only in tropical regions. "It would hardly be credited," says Professor Lindley, in his 'Fossil Flora of Great Britain,' "by persons unacquainted with the evidence upon which such facts repose, that in the most dreary and desolate regions of the present day, there once flourished groves of tropical plants of coniferæ, like the Norfolk island and Araucarian pines, of bananas, tree ferns, huge cacti, and palms; that the marshes were filled with rush-like plants fifteen or twenty feet high, and the coverts with ferns like the undergrowth of a West India island."

In the greater proportion of the fossil plants of the coal-measures there is little appearance of woody matter; stems of a foot and a half in diameter have been found with the external form perfectly preserved, but having only a coating of coaly matter of inconsiderable thickness, the interior part consisting of sandstone or clay, with now and then some more coaly matter in the centre, indicating, as it were, the pith. But trunks of trees, in which the woody texture was preserved nearly throughout the whole stem, have often been met with: they have been seen in the coal-mines of Westphalia sixty feet in length; and two remarkable instances of fossil trees in the coal-measures have occurred in Great Britain, which have been well described by Mr. Witham. In a bed of sandstone near Gosforth, about five miles north of Newcastle-upon-Tyne, a stem was found which measured seventy-two feet in length, four feet in width at its lower end, from which it tapered gradually, and was eighteen inches wide at the top. It was in a compressed state, as if flattened by great incumbent pressure, so that the above dimensions of the width are not the true diameter of the stem. The woody structure was, in this instance, only in part preserved, but in those places it was converted into a siliceous or flinty petrifaction, containing cavities lined with rock crystal; and this petrified portion was, in one place, nearly two feet in diameter. There were no roots attached to it, and no branches, but there were large knots and other places where branches appear to have been broken off. The other instance occurred in the great freestone quarries of Craigleith, near Edinburgh, from which the greater part of the New Town of that city has been built, a sandstone belonging to the coal field of Mid Lothian, but underlying, it is believed, the regular coal-measures. It was a stem forty-seven feet long,—a large branchless trunk, in some parts very much flattened, the greatest diameter being five feet, the smallest nineteen inches. It was imbedded in the solid stone, with above a hundred feet of layers of rock above it, and lay across the strata, thus passing through several beds.

The following sketch of the appearance of the tree, as it was laid bare in the quarry, is copied from Mr Witham's Memoir:—



[Fossil-Tree at Craigleith Quarry.]

The bark was converted into coal; but, in the interior, the woody texture was in many places perfectly preserved, as was shown by the ingenious process of Mr Witham above mentioned. It is conjectured to belong to the coniferæ or fir-tree tribe, but there are some peculiarities of structure which make that doubtful. A large portion of this stem may be seen in the Museum, and another in the Botanic Garden of the University of Edinburgh.

It is the general opinion of geologists that our beds of coal have been produced by vast quantities of plants carried down from the land and accumulated at the bottom of the sea, during a long succession of ages; the numerous alternations, amounting to many hundreds, sometimes of sandstones, shales, and beds of coal, proving a long duration of the process of deposition. The character of the vegetation indicates not only a tropical but also an insular climate; that is, the plants must have grown on islands in a very moist atmosphere, and in a heat as great or even greater than that of the West Indies. To account for the extraordinary luxuriance of the vegetation, M. Adolphe Brongniart, a living French naturalist, to whom we owe the greater part of all our most accurate information on the subject of fossil botany, has suggested that there was probably a much larger proportion of carbonic acid gas in the atmosphere of that

period than now exists; that gas being one great source of vegetable matter in the growth of plants. As any great proportion of carbonic acid gas would render the air unfit to support animal life, the absence of the remains of land quadrupeds, among such accumulations of terrestrial plants, certainly gives some countenance to the conjecture. This mode of accounting for the deposition of our coal-beds, is greatly in conformity with what must be now going forward in many parts of the earth to prepare beds of coal for future far-distant ages. Every river must carry down to the sea more or less of the trees and other plants which either fall accidentally into it, or are swept from the banks by the force or undermining action of the stream; and the accumulation of such vegetable matter at the mouths of the larger rivers must be very great. In the case of the Mississippi, for instance, vast rafts, composed of trees held together by the interlacing of smaller plants, which have been washed from the banks by the main stream and its numerous tributaries, are floated down into the Gulf of Mexico, bearing upon them a luxuriant covering of plants. The magnitude which some of these rafts attain, by accumulation, while they are temporarily arrested in their progress to the sea, is truly astonishing. An obstruction of this sort in the Atchafalaya, one of the outlets of the Mississippi in the lower part of its delta, produced a raft of this sort ten miles in length, two hundred and twenty yards wide, and eight feet deep. It rose and fell with the water during the changes of flood and drought, and, although floating, its surface was covered with a variety of living plants. In many parts of the coast, by depressions of the land, great forests growing near the shore have been sunk below the level of the sea; the trees have been thrown down, and in process of time covered with mud and sand, the waves rolling over them every tide. Such submarine forests now exist on the coast of Lincolnshire, and near the mouth of the river Parrot in Somersetshire in the Bristol Channel.

But it may be thought very naturally that trees and other vegetable bodies, although carried down by the rivers to the sea, would not sink, but would continue to float, until, by the gradual process of decay, they would totally disappear. But wood swims in water only in consequence of the air contained in its cells; the substance of wood is considerably heavier than water, and it therefore sinks as soon as the air is withdrawn from it. Very long soaking in water will expel the air, but this will take place more speedily when great pressure is applied at the same time; by which means, in squeezing out the air, the sides of the cells are brought closer together, and the wood becomes more dense. A remarkable instance of this has been related by Captain Scoresby, in his Account of his Voyages to the Whale Fishery in the Arctic Regions: a whale, on being harpooned, ran out all the line in the boat, and as the end of the rope was made fast, the boat was dragged by the fish under water, to the depth, it is supposed, of several thousand feet; the men having just had time to make their escape by leaping on a piece of ice. When the whale returned to the surface to breathe, it was killed; but, in place of floating, it began to sink, as soon as it was dead, in consequence of the weight of the boat, which was still attached to it by the line of the first harpoon remaining in its flesh. The sunken boat was raised with great difficulty; for so heavy was it, that, although before the accident it would have been buoyant when full of water, it now required a boat at each end to keep it from sinking. When they got it into the ship, the oaken planks were, Captain Scoresby says, "as completely soaked in every pore, as if they had lain at the bottom of the sea since the flood." A piece of light fir-wood, about fifteen inches square, that had gone down with the boat, when thrown into the water again sank like a stone.

It may be said, however, that, granting this transportation of trees and plants by rivers,—granting their sinking to the bottom of the sea, and their alternation there in layers with beds of sand and clay,—still their conversion into coal has to be accounted for; a substance not only different in appearance but also in properties from the substance of trees and plants. Here the researches of chemical science have come to our aid; for the conversion of vegetable matter into coal has been proved, by the observations of Dr. M'Culloch on peat-bogs, and by a series of experiments in the laboratory, instituted by the same distinguished philosopher. Coal, freed from its adventitious earthy matter, which is merely mechanically mixed with it, is resolvable into the same ultimate elements as wood; and Dr. M'Culloch ascertained that the action of water on turf, or submerged wood, is sufficient to convert them into substances capable of yielding bitumen on distillation, and black and brittle like those varieties of coal called, by mineralogists, lignite and jet; and he is further of opinion that great pressure and long-continued action may have produced the other modifications. The coal so produced differs, however, very materially in appearance and properties as fuel from the coal of our mines; and the last link of the chain between a lump of Newcastle coal and a growing tree has yet to be found.

[In our next section we shall describe the geographical distribution of Coal in the Mineral Kingdom.]

THE ICELANDERS.—No. 2.

Iceland, which was so well known to England and the other northern countries of Europe in the time of its literary supremacy and its wandering poets, in subsequent periods of history seems to have been gradually withdrawn from all observation. The popular accounts of the island were such as could be collected by Greenland whale-fishers, who now and then touched at it, and were copiously mingled with fable and the superstitions of uneducated seamen, on whom volcanic and other phenomena made an awful impression.

The late Sir Joseph Banks, in 1772, undertook a voyage to Iceland, accompanied by Doctors Solander, J. Lind, and Uno Von Troil. Dr. Von Troil, one of his companions, who was a learned Swede, son of the Archbishop of Upsal, after his return to Sweden, drew up in a simple form, and popular, unostentatious style, an account of all that the expedition had seen and learned in Iceland. There had been several accounts ot the island before published; but this was the most correct and instructive. A subsequent narrative of a journey made in the summer of 1810, by Sir George Steuart Mackenzie and Dr. Holland, confirms the account of Von Troil as to the excellent moral qualities, and the high intellectual attainments of the poor Icelanders.

The whole of Iceland is a chain of volcanoes extinct, or, to a greater or less degree, in action; its soil is almost everywhere formed of decayed cinders, lava, and slags. Numerous springs of boiling hot water, in columns of great diameter, shoot high into the air, carrying large stones up with them, as do the flames from the crater of a volcano. Some of the many mountains, that cross the island in every direction, are always covered with snow and ice; and the valleys between these mountains are in most instances strewn with hard, black, naked lava, for the distance of miles. Avalanches, called by the Icelanders *snioflod* (snow-flood), are of frequent occurrence, and the mountains themselves not unfrequently crumble away and roll down into the plain, burying the cottages or the farms beneath. Earthquakes, moreover, are very common, and at times (as happened in 1755) so violent, that the houses of a whole district are seen overturned, and hills rent asunder. Dreadful hurricanes, being still more frequent, are as ruinous as earthquakes.

In some places there grow stunted birch, juniper bushes, and other underwood, but a tree is not to be seen on the whole surface of Iceland. Where the volcanic matter has been sufficiently decomposed or crusted with vegetable earth, both the plains and the mountains offer tolerable pasturage, and thus enable the islanders to keep large flocks of sheep, on which, and their fisheries, their support mainly, or it may be said entirely, depends. Fortunately no wild animals except rats and foxes breed on the island; but they are liable to the visits of huge Polar bears, that are floated to their shores on detached pieces of ice. If these animals effect a landing, they generally prove very destructive to the sheep. To prevent this the Icelanders are very vigilant. When fire-arms are scarce, they put out to sea in their little fishing-boats and attack the invaders with spears and fish-hooks. If killed and secured these bears are of no mean value to them, for they cure and eat their flesh, and make excellent winter cloaks or rugs of their skins. The waves of the ocean, by throwing on their coast quantities of drift-wood from America and other parts, also increase the resources of the poor Icelanders. They use it for fuel, and the small houses they inhabit are frequently built of this drift-wood. Their residences are, however, more generally made of blocks of lava, the interstices between which they carefully fill up with moss to keep out the cold. Their roofs are of turf, and the windows, instead of glass, are furnished with the thin membranes of sheep or lambs. In small fenced spots near these primitive abodes, they cultivate cabbage, parsley, spinach, turnips, potatoes, with some other roots and vegetables, and raise flax and hemp as materials for their own clothing. The luxury of a single fruit tree is unknown.

Within, the scene is more cheerful; for, while the little hut is almost buried beneath the snows of winter, and darkness and desolation cover the land, "the light of an oil-lamp illumines the page, from which the father reads to his family the lessons of knowledge, religion, and virtue." In these regular evening readings the master of the family always begins, and he is followed by the rest in their turn. Even during their daily in-door labours, while some are employed in making ropes of wool or horse-hair, some in preparing sheep-skins for fishing dresses, or in spinning, knitting, or weaving, one of the party generally reads aloud for the amusement and instruction of the whole. Most farm-houses have a little library, and they exchange books with each other. As these houses are scattered over a wild country, and far apart, the only opportunity they have of making these exchanges is when they meet at church; and at church a few always contrive to be present even in the most inclement weather. In many parishes there is also a small collection of books, the property of the church. This library is under the superintendence of the minister of the parish, who lends the books to any family of the district that may be desirous of increasing its means of instruction and amusement. The parish priest, acting occasionally in aid of the parents, is also the schoolmaster of the district, and keeps a register of the intellectual and moral improvement of the younger part of his flock. He himself is exempted from few of their laborious occupations, enjoys few additional privileges or comforts, and only keeps his place in a society, where all are anxious for instruction, by the superiority of his intellectual attainments. In their ecclesiastical code, a singular law, but admirable in design, gives to the clergy the power of preventing any marriage where the female is unable to read; and thus, in the instruction of the mother, on whom so much depends, this law provides for the education of the offspring. Sir George S. Mackenzie and Dr. Holland remarked that, except at the great fishing stations, it was rare indeed to find any Icelander, whatever might be his condition, who could not both read and write. But they have much higher accomplishments. Latin still forms part of the education of the people, as well as of the clergy—the Icelanders still write it, both in poetry and in prose; and it is a common thing for the stranger, while traversing their country, to find his peasant guide addressing him in good Latin, and his host at night, drawn, perhaps, from the humble labours of the smithy, conversing with him in the language of Virgil and Cicero, with great fluency and elegance. Not a few of these poor islanders are also well acquainted with the language and literature of ancient Greece. Among modern tongues they have cultivated the Danish, the German, and the English. In 1810 they had translations from Addison, Richardson, Young, Pope, and Milton.

The general attainments of this people are the more surprising, as owing to the distance from place to place, or even from house to house, to the frequent interruption of all communication by snow-storms and inclement weather, to the necessity in which nearly all are of almost constantly working in some way or other for their support, and to other circumstances, the Icelanders cannot follow any extended scheme of public education, but depend entirely for the acquisition and transmission of knowledge on their own private resources and domestic habits. In the year 1810 there was only one public school in the whole island.

The fine arts in Iceland have not been cultivated with the same success as literature. Although by the old laws of the country, music as well as poetry was expressly made a branch of common education, their music has been stationary at a very simple, if not a barbarous point. Nor have painting and sculpture made much more progress. Yet here it is well to observe that the celebrated modern sculptor, Thorvaldson, who so long resided at Rome, where he was second only to the great Canova, was the son of an Icelander.

In describing their readings and fondness for books, we have described the principal amusement of these people. Another of their pastimes is to meet together at their leisure hours, and to recount to one another the history of former times,—"so that," says Von Troil, "to this day you do not meet with an Icelander who is not well acquainted with the history of his own country." They also recite verses at their festive meetings, where there is rarely anything drunk save an unfermented preparation of milk with water; and sometimes a male and a female sing a poem in dialogue, in a slow, cadenced sort of recitative. They are great chess-players, and familiar with several ingenious games at cards, but they never play for money.

The ordinary food of these civilized peasants is very poor. Bread is often a stranger to their mouths for months, and that which they eat consists of sour biscuits, and hard, dry rye-bread, imported from Copenhagen. Fish is the most important article of consumption among them, and they eat the flesh both of sharks and whales. The dangers to which they are exposed while fishing in their stormy seas are great, and though they meet them like brave men, they are fully sensible of their existence. Whenever they put off from shore, they reverentially take off their caps, sing a short hymn in concert, and in a prayer recommend themselves to the merciful protection of the Almighty.

The dress of the Icelanders is neither smart nor ornamental, but almost invariably neat, clean, and well suited to their rigid climate. They have all (that great criterion of civilization) a supply of body linen, and every man wears a linen shirt of his own household manufacture.

In person the Icelanders are neither strong nor handsome: in their dispositions they are mild, reflective, and serious; they have no boisterous mirth, but a sober, subdued cheerfulness, which is better, and lasts much longer,

Hospitality, to the utmost extent of their means, is one of their many virtues. No people in the world are more attached to their native land, which, cold, stormy, and desolate as it is, they prefer to every other country. The present population of Iceland is stated as being about fifty thousand.

Bread, in some parts of Sweden.—It was impossible not to be struck with a specimen that was pointed out to our notice of the food of the peasantry, during a hard season, in the more remote districts. It was a cake from Dalecarlia, made of the bark of trees: of this provender the birch is the most common in use, while that of the pine is held luxurious and dainty fare; but to procure a little rye-flour, and add it to this wretched mixture, is a happiness that falls to the lot of few. The inner bark or parenchyma is applied to this purpose: it is simply macerated in water, ground up, and formed into cakes of the consistence of a wafer; their taste is slightly bitter, but seemed, I thought, by no means less palatable than the coarse leaven bread of rye, made with old sour yest, which generally may be called the "staff of life" even throughout the more fertile parts of Sweden. The use of so poor a diet in a climate that requires the most nutritious regimen is attended with its inconveniences: the rustic peasants in general, though large and bony, are of a spare habit, and on the smallest alteration or improvement of their food are subjected to severe attacks of plethora. Many of these poor creatures do not survive their first visit to Stockholm, where, when they are ill of a surfeit, their disease is usually called the Dalecarlian malady, from its prevalence among that people: this complaint, indeed, seizes upon them in so great numbers, as to give an idea to the vulgar of its being contagious, and one frequently hears, as the phrase is, that it is "going about."—*James's Travels in Sweden and Russia, &c., during the Years* 1813 *and* 1814. The same traveller afterwards gives a remarkable instance that occurred in 1788, when a regiment of provincial militia was called to do duty at the capital. Among the rations allowed to these men were wheaten bread and a little meat,—a violent malady and considerable mortality in the regiment were the consequences of this sudden change of diet, nor did the men recover until an inferior bread, adulterated to the requisite degree of meagreness and indigestibility was served out to them, and the more nutritious parts of their food withdrawn.

BRIGHTON CHAIN PIER.

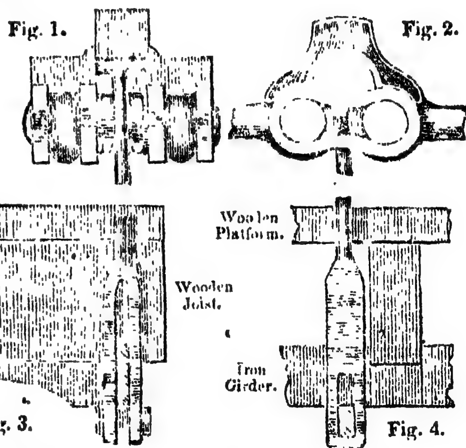
IN our account of 'The Great North Road,' we gave views of several suspension bridges: the same principle, viz., of suspending a roadway by rods, from chains hanging in a curve from one tower to another, has been employed in several cases, by Captain Brown, for constructing piers, or jetties, extending many hundred feet into the sea, and forming thereby most commodious quays, and landing-places at all times of the tide, and in situations where no vessel of a moderate size could approach the shore.

The town of Brighton has enjoyed the benefit of this useful contrivance, where, as many of our readers know, a beautiful chain pier has withstood the buffeting of storms for nine or ten years past. On the 15th October last, however, for the first time it suffered severely from a storm; and from the total absence of all eye-witnesses to the catastrophe, there appears to be great difficulty in determining how it was actually produced.

It appears that at half-past seven in the evening a tremendous gale came on from the west, attended with heavy rain and lightning; a very short time previously, the pier-master had returned from the pier, when it was in every respect in its usual state. The night was dark, so that a person on the cliff could not easily discern the progress of destruction; but as it was low water, so low, that it is said there was no water under some parts of the pier which suffered most, it is evident that the water could not cause the destruction. Some persons have supposed it must therefore be the effect of lightning; there was lightning on that evening, but all concur in stating that it was not accompanied by thunder, consequently it must have been too far off to have struck the pier. Neither is there any probability that lightning could injure the pier: there is not a rod used in its construction which is not considerably thicker than the common iron conductors used for the protection of buildings; the rods, therefore, could not be melted, and indeed there is not the slightest trace of melting in any part of them; and as every rod is in close contact, they form one uninterrupted conductor, both ends of which terminate a considerable distance underground. The damage, then, is to be attributed to the wind; and it is interesting to inquire in what way the wind produced so great an effect, the pier having previously withstood much more tremendous gales.

The pier consists of a platform, about thirteen feet wide, and about a thousand feet long, suspended from eight chains, passing over four towers, the chains being at one end fixed in the cliff, and at the other end fixed in masonry sunk in the sea. The eight chains are arranged in pairs, side by side, there being two pair on each side the platform, one pair being hung about twelve inches above the other. The parts between the towers are called bridges; and to distinguish them we may call them the first, second, third, and fourth bridges from the cliff. The towers are made of cast iron, and each rest upon twenty piles, driven with more than the usual force into a bed of chalk; the last tower and the extension of the platform, forming the pier head, rest upon 100 piles, well bound together, and further stiffened by piles driven diagonally.

The four main chains are made of wrought iron, two inches in diameter, in links ten feet long; and the platform is suspended from the main chains by suspension-rods about one inch in diameter; the upper ends of the suspension rods are inserted in hollow caps, resting on the joints of the main chains. Figs 1, 2, 3, and 4 show the construction of these caps, and of the suspension-rods and platform.



The principal damage done to this beautiful structure was in the second and third bridges; the platforms of both were more or less destroyed, most of the suspension-rods snapped, and the main chains were left hanging almost independent of the platform, one of the upper pair of chains being separated from its companion and twisted round the pair below it. In the first and fourth bridges there was little other effect produced than what might result from the sinking of the main chains in consequence of the counterbalancing weight of the second and third bridges being removed; thus these bridges had swagged down, and parts of the hand-railing were broken and some of the suspension-rods were bent, but almost all the caps of the suspension-rods appear to have been moved; some of the towers are also thrown out of the perpendicular.

Let us now consider the manner in which the wind most probably produced its destruction. Some have

supposed that a violent gust of wind had lifted up the third bridge, and that when it fell again it snapped the suspension-rods. Now it does not appear likely that any gust of wind could lift so heavy a body; while a moderate storm, if we may use the expression, could, under certain circumstances, easily cause such a structure to swing to and fro.

The writer of this article once tried, by mere strength of arm, to put in motion the main chains of a suspension bridge, 400 feet in length between the towers. At the first few thrusts no sensible motion was produced; but as care was taken to time the thrust, just as is done in the common amusement of swinging, the whole bridge was soon set in motion.

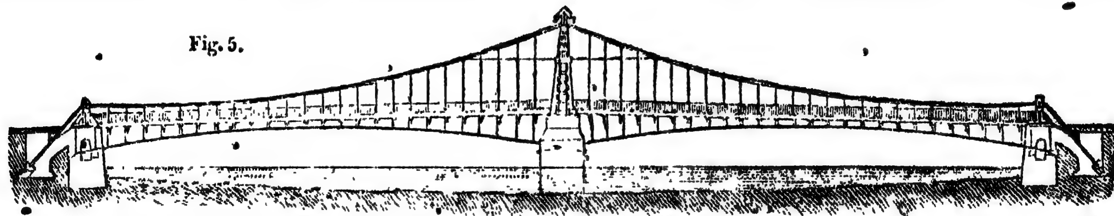
On the night of the accident, the wind was due west,—and consequently it fell directly at right angles on the pier, the most favourable direction for producing vibration sideways. The first gust of wind would produce a very slight vibration; but whether the vibration were little or great, it would follow the laws of the pendulum, and take, we will suppose, three seconds to make one vibration, namely, three seconds to attain the end of its motion east, and three seconds to return to the end of its motion west, making together six seconds. Now, every gust, which did not take place in twelve, eighteen, or twenty-four seconds, or some other multiple of the time of vibration, would tend to stop the vibration; which has probably been the case in all previous storms, the wind being generally so irregular as generally, perhaps, in the case of vibration, to counteract its own violence. Thus, it is not the weakest trees of the forest which are destroyed by the storm, but probably such whose times of vibration happen to correspond with the times of the gusts.

Now, we have only to suppose that, on that particular night, the gusts of wind happened to recur in intervals corresponding with the time of vibration of the main chains, *i. e.*, in eighteen, twenty-four, or thirty seconds, or in some other multiple of six seconds—the time we have to suppose the bridge would take to vibrate from the west to the east and back again to the west; and then, although those gusts might be far less violent than many a storm before, yet, occurring at these particular times, they might produce so violent a motion, as to wrench off the heads or break some of the centre suspension-rods, where the vibration would of course be greatest: when the centre rods gave way, the weight of the centre part of the platform would be thrown on the adjoining suspension-rods, which would, of course, more readily give way: as soon as the suspension-rods had suddenly set the main chains at liberty, the weight of the adjoining bridge would suddenly draw up, or, as the result has showed, fling up the chains of the broken bridge, and thus account for the entangling of one chain with the other. The separation of the one chain in the upper pair from its fellow was very possible, as soon as the caps of the suspension-rods were dislodged, the pair not being held together, except by these caps.

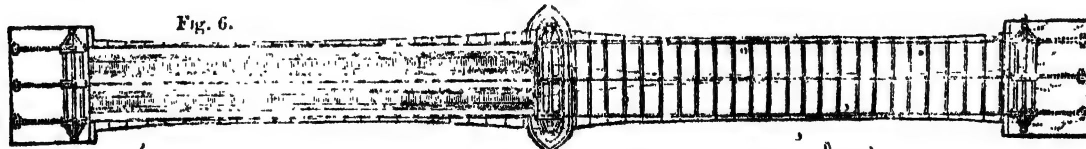
A practical illustration of the effect of repeated impulses, at stated intervals, occurred some time since at the Broughton suspension bridge, near Manchester, which had stood the ordinary traffic well; but one day a regiment of soldiers was passing over the bridge—the first and second companies walked over with irregular step and passed safely; as the third company were passing over, a fifer struck up a favourite march, and the men immediately dropped into the regular military step, and presently the bridge gave way and let them all into the river,—fortunately every man got out without any material injury.

In this case the bridge might be said to have broken with a weight which it had previously borne, just as the chain pier is said to have given way to a force which it had previously borne; but as, in the former case, the damage was done by the stated impulses of the men's feet, so, in the latter case, the damage was in all probability done by the stated impulses of the wind.

If the foregoing suggestions be correct, namely, that the disaster was produced by the swinging of the chains and platform to and fro, it will show the importance of a contrivance added, by Mr. Brunel, to two suspension-bridges, constructed by him for the Isle of Bourbon about ten years since, and that similar precautions may be useful even in this country. An accurate description of one of these bridges is given by Dupin in his 'Commercial Power of Great Britain.' Dupin observes, that "it was necessary that the bridge should be sufficiently powerful to resist storms which tear up trees by the roots and swallow up vessels by gusts of wind, which act with extraordinary force not only in a horizontal but in a vertical direction, and, by turns, upwards and downwards."



[Isl of Bourbon Suspension Bridge.]



[Plan of Isle of Bourbon Suspension Bridge.]

Mr. Brunel obtained a proper resistance (see Figs. 5 and 6) by employing a double system of chains: first, the usual upper chain; secondly, lower and inverted chains, united to the road-way of the bridge by vertical rods, which are, properly speaking, the suspending-rods of the inverted chains. In order to give firmness to the road of the bridge, horizontal with the stream, the lower chains, instead of being on a parallel plane with the upper ones, diverge from them near the points of support, as is clearly shown in fig. 6

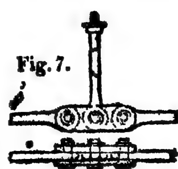
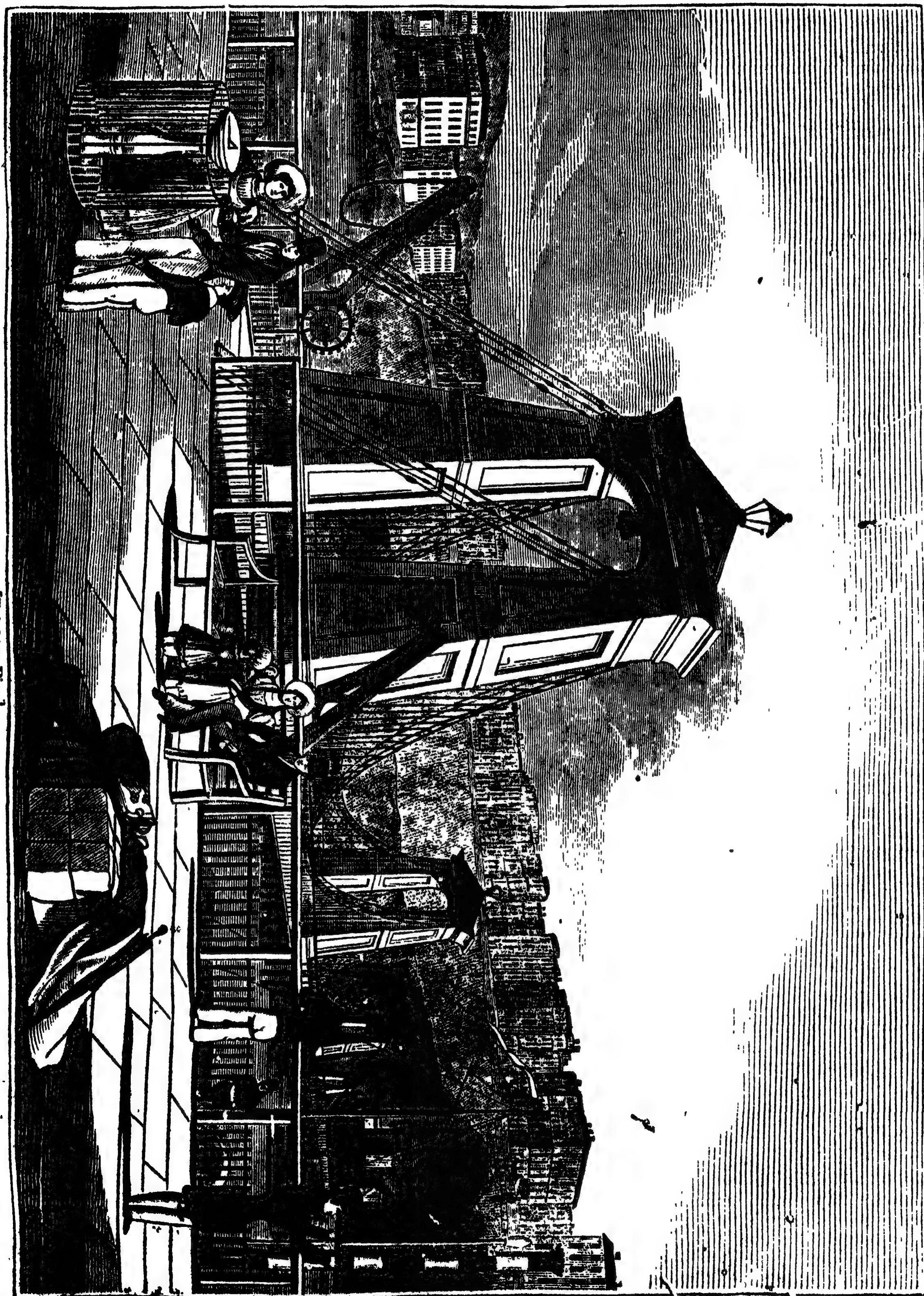


Fig. 7 shows the manner in which two bars of the inverted chains and one of the lower suspension-rods are joined together. From this figure it will be seen that two flat links, pierced with three holes to receive three bolts, belong respectively to two contiguous bars of the inverted chain, and to the lower rod between them. The upper part of this suspending-rod

goes through the corresponding beam close, to one of the upper rods, and is fastened by a screw on its head. The last bar of the inverted chain goes through the whole thickness of the masonry of the central pier of the bridge, and, on coming out, is set in a large plate of cast iron; thus a great part of the pier has to support the great strain or tensions which the inverted chains must experience during storms and when the wind blows upwards. The same system is used to attach the other extremities of the inverted chain to the abutments. These inverted or, as they may be called, stay-chains have been found hitherto to answer the purpose.

Since the above observations were written, a public subscription has been made for repairing the Brighton Chain Pier; and it has also been stated, in one of the public journals, that it is intended to add stay-chains: these, there is no doubt, will render it perfectly secure.



[Brighton Pier.]

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ST. PETERS.—No. 2.



[Central Nave of St. Peter's.]

THE interior of this wonderful church is, on the whole, as grand and beautiful as the exterior, though, like that, not free from architectural defects.

It is not, however, when the stranger first crosses the threshhold of its grand gate that the full majesty of the place bursts upon him, but it is by degrees, and after repeated visits that he is made sensible of its size and matchless sublimity. All who have written on the subject agree in this impression. The various parts of this vast church are so well proportioned to each other, every thing being on the same scale of greatness, that the eye is deceived by the harmony which exists, and can only judge of the real size of particular objects, by comparing something in the edifice within reach with something analogous to it in the ordinary works of nature. Thus two figures of cherubs, supporting the vase of holy-water near the door, which are six feet high, do not look bigger than children of five years of age; nor are their dimensions understood except by referring to some living man or woman who may be standing near them. And again, the figures of the Evangelists, which decorate the inside of the cupola, do not appear larger than life, though the pen in St. Mark's hand is six feet long.

Something also may be found to account for this impression in the elegant notion of Madame de Stael, who fancies the objects are not so much diminished as the spectator's faculties are raised and aggrandized when he finds himself for the first time within the sacred precinct; and some weight, moreover, must be given to the remark of the acute Forsyth, who says, "But greatness is ever relative. St. Paul's is greater because every thing around it is little. At Rome the eye is accustomed to nobler dimensions, and measures St. Peter's by a larger scale."

The lateral aisles, and the numerous chapels which break off from the grand whole of the temple, have been made amenable to criticism; but the central nave, as represented in our cut, is infinitely grand and sublime. It is eighty-nine feet in breadth and one hundred and fifty-two feet high; it is flanked on either side by a noble arcade, the piers of which are decorated with niches and with fluted Corinthian pilasters. A semicircular vault, highly enriched with sunk panels, sculptures and gilded ornaments of various kinds, is thrown across from one side to the other, producing the most splendid effect.

Walking up this magnificent avenue, which in itself is one of the grandest works of art, the visiter comes to

a part of the building incomparably more magnificent still; we mean, of course, the crown of the whole,—the great soul of the composition,—Michael Angelo's cupola, which is raised over the centre of the plan.

"The cupola," exclaims Forsyth, "is glorious! Viewed in its design, its altitude, or even its decoration;—viewed either as a whole or a part, it enchants the eye, it satisfies the taste, it expands the soul. The very air seems to eat up all that is harsh or colossal, and leaves us nothing but the sublime to feast on,—a sublime peculiar to the genius of the immortal architect, and comprehensible only on the spot!"

Standing on the pavement of the church, immediately beneath this vast concave, and gazing upwards, through a wide uninterrupted void to the height of four hundred and twelve feet, the effect is almost overpowering; there man shrinks, as it were, into nothingness beneath the wondrous works of man! Architecture can boast of nothing so sublimely impressive as this!

The concave surface of the cupola is divided into compartments, is enriched with majestic figures of saints in mosaic and other grand works of art, and is brilliantly lighted from above and below. In the centre of the cross, where the sea of light pours down from the dome, and ten or twelve feet beneath the pavement of the present church, is the tomb of St. Peter, before which a hundred lamps are constantly kept burning.

In describing the exterior of the church we have mentioned that the most glorious effect produced is when the cupola is illuminated; and so, in the interior, the temple is never seen to such advantage as when (on the evening of Good Friday) it is lighted solely by an immense cross of brilliant lamps suspended in the centre under that dome. The cross sheds a liquid brilliancy on a vast space where the pope, in white robes, and all the cardinals ranged behind him, kneel in silence for the space of half an hour. During that time you might hear the fall of a pin. A pale and uncertain light, diminishing in proportion to its distance from the glorious focus of the cross, fills the rest of the temple, developing with a veil-like, undecided effect, which cannot be described by words, the colossal statues on the tombs, and the crowds of living beings assembled there who look like pigmies. At this season the stately columns and pilasters seem to swell in size,—the roofs and the dome rise even higher than their usual elevation,—the whole church dilates its vast dimensions! It is said that the great Michael Angelo, who was great in architecture, sculpture, painting, poetry,—in every thing he did or projected, first gave the idea of thus illuminating the interior of the church by the cross alone.

In a brief sketch like this, we can neither enter on the architectural details, nor describe the wonders of art in sculpture, painting, and mosaic contained within St. Peter's. Either of these subjects, indeed, would occupy a volume. We have said there are faults detected within the church as well as without; but absolute perfection is not a faculty of man, and besides this edifice was not the work of one great genius but of several architects in succession—some of whom had none of the judgment and grand taste of Michael Angelo, and all of whom widely departed from the plans he had laid down for building the whole of the church. As it is, however, a visit to St. Peter's is an exquisite pleasure, and one calculated to elevate and improve the soul of man. "All the time I was in it," says an eloquent French writer, "my thoughts were fixed on God and eternity*." It is a spectacle too that never tires—you may visit it every day, and always find something new to admire. This will be easily conceived if the reader only reflect on the fact, that for several ages, and through a long succession of popes, the fine arts have never ceased adding new riches to the temple on canvass or in mosaic, in marble or in bronze.

The temperature of the air within its vast enclosure is delightfully mild and genial—it is cool in summer, and comfortably warm in winter—it is, in fact, almost invariable. Nothing can well be more exquisite than to escape on a hot summer's day from the streets of Rome and the glaring light and oppressive heat, and to seek refuge in the cool atmosphere of St. Peter's. The winter at Rome, too, is sometimes sufficiently severe to enhance the value of its genial temperature at that season.

A similar advantage is enjoyed in most of the great churches in the south of Europe, but in none to such a degree as in St. Peter's, where a perpetual spring may be said to reign. Nor is this produced by any actively artificial means: there are no fires or other modes of warming in winter, and there are no peculiar processes for ventilating or otherwise cooling in summer. It arises solely from the enormous thickness and solidity of the walls throughout; from the comparatively few and small apertures communicating with the external atmosphere; and from the immense bulk of the air enclosed within the temple, that neither parts with nor receives heat in sufficient quantity to effect in any perceptible degree the equability of its temperature.

[To be continued.]

* Dupaty, Lettres sur L'Italie.

THE PLAGUE OF BAGDAD.

(By one of the Survivors.)

In the early part of the year 1831, the people of Bagdad remained in anxious but passive expectation of the calamities of war and plague; and they waited not long before calamities, more in number and greater in extent, than the worst they had feared, came upon them.

In the year preceding, Tabreez had been devastated by the plague; and all eyes at Bagdad watched anxiously to observe in what direction it would travel from that city. It was not long left doubtful. It came down slowly upon Bagdad, pausing at Kerkook, where thousands of the people fell before it. Yet, with such distinct warning, none at Bagdad thought of endeavouring, by sanitory measures, to avert the pestilence from the city before it came, or from their houses after it had come. The customary intercourse of traffic and of travel went on without restriction between the city which dreaded the plague, and those places where it was known to be then actually raging. Moslems in general regard all sanitory precautions as measures of futile and wicked opposition to that divine will which *must* be accomplished. And as the pestilence, which visits Bagdad about once in ten years, had generally passed over it so lightly, that an extensively destructive plague was a thing for garrulous old age to talk of as an event which had happened some sixty years before, each seemed disposed to trust to his chance of being one of the many who escaped, rather than of the few that died. Death by plague is also regarded as a martyrdom: and these considerations combined, resulted in that actual passiveness for which the Turks are noted; while a degree of anxiety was at the same time manifested, from which that singular people are supposed to be exempt.

About the middle of March, the plague was introduced into the city by some people of Kerkook; and on the 29th of that month its presence was distinctly ascertained by the medical officer attached to the British Residency, who, on a personal inspection of the persons reported to be sick, found on them the glandulous swellings by which the true character of the disease was indicated. This gentleman (who himself was one of the earliest victims of the plague, in attempting to escape from it,) almost despaired for the city when he saw the diseased and healthy crowded together in the same rooms; and,

although he felt that under proper measures the pestilence might be confined to the quarter in which it then existed, he could hope nothing when men went about, without restraint, from the chambers of the plague to the bazaars and coffee-houses.

The population of Bagdad, at the commencement of the plague, may be considered to have been somewhat more than 80,000. Of this number 7000 perished in the first fortnight; and as this presented a daily average of mortality equal to the *maximum* in plagues considered very bad, and exceeded the *maximum* in that of Tabreez, it was, not without reason, hoped that the rage of the pestilence would then subside. It had scarcely commenced. At the termination of the period mentioned, carbuncles began to appear in the patients, and from that time the *daily* mortality increased with a rapidity truly frightful, until, towards the end of April, it attained the *maximum*, as nearly as the comparison of different reports enabled us to ascertain, of little less than 5000; and at the termination of the calamity, it was computed that out of 70,000 persons, (which allows more than 10,000 to have perished from other causes, or to have escaped,) not less than 50,000 were destroyed by the plague in the two months of its duration. Although this can only be regarded as an approximation, the desolate state in which the city was left shows that the amount of mortality could not have been much less, but very probably more.

This extent of destruction, which, in proportion to the population, far exceeds that of any other plague of which authentic record remains, is not to be attributed to any peculiar virulence in the pestilential *miasma*, but rather to concurring circumstances, which, in the first instance, precluded the dispersion or escape of the people, and, in the second, obliged them to congregate densely in particular parts of the city.

In ordinary circumstances, large numbers of the upper classes would have removed to Bussorah, Mosul, or Damascus, and other towns; and the poor would have dispersed themselves in the open country. But at this time the Arabs, scarcely at any time manageable, were emboldened by the knowledge that Ali Pasha of Aleppo was marching upon Bagdad with a firman from the sultan, empowering him to depose the ruling Pasha, and occupy his place. Various parties therefore fixed themselves in the vicinity of the town, for the express purpose of plundering those who might endeavour to escape from the plague; and, if these were avoided, others—whole tribes—lay beyond, who had equally no fear of the Pasha before their eyes, and who, except from such fear, would think no more of plundering a man of all he possessed than, to use their own expression, of peeling an onion. This consideration prevented many from attempting to escape; and many who were hardy enough to make the attempt soon returned, deprived of all they had taken with them, even to the clothes they wore.

Few of those who did succeed in getting to some distance from Bagdad without being plundered, had much cause to congratulate themselves on their good fortune. The rivers Euphrates and Tigris are flooded twice in each year; first, in the spring, from the melting of the snows in the mountains of Armenia; and then, in autumn, from the periodical rains. This year the plague had begun to assume its most terrible features, when the rivers overflowed their banks in a manner without recorded or traditional example, laying the country, in the lower part of their course, completely under water. Many of those who were then on their way to other places were drowned; a few found the means of returning to Bagdad; and many who saw the waters gathering around them, and equally precluding their progress and return, were enabled to retreat to some rising grounds, where they established themselves, and waited many most weary weeks till the subsiding waters allowed them to return. Many of these parties were miserably thinned by famine and by plague; for they were able to obtain no supplies of food; and, by a most unaccountable infatuation, persons who were escaping from the plague, in the contagious character of which they believed, did not hesitate, on leaving Bagdad, to admit of their parties individuals then distinctly known to have that disease upon them. Many of the survivors, on their return to Bagdad, described in strong language the intense longing which was generally felt to return to lie down and die in their own houses.

At Bagdad the waters were for some time excluded by the walls of the town; but, on the night of the 26th of April, a part of the wall on the north-west side of the city was undermined and fell. The waters then rushed in, and overthrew in their career about 7000 houses, burying in the ruins nearly 15,000 persons, many of whom were sick or dying of the plague, besides a large number of unburied dead. Those who escaped from the immediate consequences of this fearful irruption, withdrew to such parts of the city as remained entire or less ruined, where they were received into the houses of their friends, or congregated, sometimes to the number of thirty, in the houses which the owners had forsaken, or which the plague had desolated; and from the daily fall or partial ruin of single houses subsequently, the population was undergoing such a continual process of condensation, until the subsidence of the waters, as completely excluded the city from the benefit which, under ordinary circumstances, would have resulted from the reduced numbers of the population. The inundation is, therefore, to be regarded as the proximate cause of that unexampled amount of destruction which the plague effected.

It also resulted from this condensation of the population, and from the deprivation of the usual resources for the disposal of the dead, that the sickening horrors of a plague were accumulated tenfold before the eyes of the survivors. Burial-places in the East are generally without the town. These were, at Bagdad, laid under water, and while the disposition and power lasted to bury the dead at all, every open space—the streets, the yards of mosques and stables, were turned up to furnish graves. In a stable-yard, which the terrace of our house overlooked, nearly a hundred graves were opened and filled in the course of one day and a half. It was a fearful thing to see the uncoffined dead brought in barrows, and on the backs of asses, and laid upon the ground till the graves were ready for them.

At this early period of the plague, the usual custom was generally observed of enfolding the bodies in cotton, like mummies; but when cotton was becoming scarce and dear, the richest natives, in order to secure for themselves some of the honours of the grave, went in person to purchase their own winding-sheets of the only man who then, at his own house, sold the cotton, and who on this occasion made immense profits which he did not live to enjoy.

But, with the increase of mortality, both the power and inclination to inter the dead diminished. If the means of removal had existed, they would, I was informed, have forsaken their houses, leaving the accumulated dead unburied in them; but this being precluded, the dead bodies were put out into the streets, where they were greedily devoured by the lean and ravenous dogs which swarm in the cities of the East. He did much, then, who took the dead of his household to the river and threw them in.

My own observation does not confirm the statement, that the very young and very old, the feeble and unhealthy, fall the readiest victims of the plague. The plague at Bagdad was so far from being that

———" Envious nipping frost
That bites the first-born infants of the spring,"

that one of the most affecting circumstances with which it was attended was the number of little children who had lost their parents and friends, crying and lamenting in the streets for the want of that food and attention to which they were accustomed; and, on the other hand, very aged people stood unscathed, while their children and grand-children fell around them.

From the earliest stages of the plague, the shops were closed, and all business of the city ceased. Even the water-carriers soon discontinued to serve their customers; so that such Europeans as had determined to shut themselves up in their houses were severely tried between the dread of introducing the contagion and the necessity of sending some of the household to fetch water from the river. Even the mosques were shut, and the sonorous voices of the *muezzins*, calling the people to prayers from the glittering towers of Bagdad, were heard no longer. If one looked into the street, instead of the bustling shopkeeper and artisan, the stately and long-robed merchant and scribe, or the pleasant groups of people laughing, smoking, and telling tales at the doors of their houses, he saw the dead and dying only,—unless a solitary individual now and then appeared, bearing in his hand a bunch of herbs, an onion, or a rose, as a protection from contagion.

The pressure of famine was also heavily felt, then and after. The inundation cut off the supplies from the country, and nothing was bought or sold. No fresh provisions of any kind could be had; and though the superior classes, having generally a stock of corn on hand, were preserved from absolute want, respectable persons came often to our door to beg a bit of bread, while the poor Arabs of the town endeavoured to supply their wants by breaking into the houses where they supposed provisions might be found.

As the season became warmer the rage of the plague abated: most of those who were attacked recovered, which had rarely before been the case; and, towards the end of May, about two months from its commencement, the pestilence was considered to have ceased. But the inhabitants were not allowed—

"To gather breath in many miseries;"

for no sooner was this known to the officers of Ali Pasha, (who only waited for the cessation of the plague and the subsiding of the waters,) than they marched their troops down from Mosul to invest the miserable and desolated city

CITY OF CANTERBURY.



[Canterbury, from the Railway.]

In our present notice of this ancient and venerable city, we shall confine ourselves to a general account of its situation and appearance; but the place contains so many individual objects of interest, that it will furnish us with abundant matter for two or three additional articles in future Numbers.

Kent, it has been remarked, is the only county in England which now retains its Celtic name, the present names of all our other counties being of Saxon origin. The word *Kent*, or rather the Celtic term of which that is a somewhat corrupted form, signifies a head or termination, and was, therefore, a very appropriate designation for the part of this island projecting towards the opposite continent, by whose inhabitants it was in all probability first bestowed. We find the same word entering into other names of places in different parts of the country. Thus, for example, on the north coast of the Frith of Forth in Fifeshire, North Britain, there is a village called Wemyss, from the Celtic *Uamh*, a cave, the rocks in the neighbourhood being several of them hollowed out into spacious excavations, which probably served as strongholds for the ancient inhabitants. About three miles to the north-east of Wemyss there is a romantic rocky valley, or den, as it is there called, the

steep sides of which are also excavated in various places, and where there is one opening in particular, unquestionably artificial, which penetrates in several directions to a depth that has never, we believe, been ascertained. This probably was accounted the head or chief cave, or at least the termination of the line of these subterranean fastnesses; and accordingly the place received the name of *Kean-uamh*, that is, the head of the caves, now corrupted into Kennoway. There is a considerable village built along the edge of the precipice.

The same term is found in the name Canterbury, which is merely the burgh of Kent, or of the people of Kent. This, however, was not the most ancient name of the town, if we may judge by that which the Romans gave it, *Durovernum*, a term formed no doubt from the British name, by smoothing it down and giving it a Latin termination. Durovernum, like Durobrevum, the Roman name of Rochester, is probably made up in part of the British *Dwr*, water, but beyond this the etymology can hardly be traced. The town stands upon the banks of the river Stour; indeed a considerable part of it is built on an island formed by the separation of that stream into two branches; and the *Dur* of Durovernum may be concluded to have expressed a reference to this position. The Stour rises south-west from Canterbury, and, on leaving the town, passes on in a north-east direction, till it falls into the sea, after having formed the greater portion of the south-western boundary of the Isle of Thanet.

At the point where Canterbury stands, the valley in which the river flows is about a mile in width, and the hills by which it is bounded on both sides are of very moderate height. Numerous rivulets, however, descend from these to the lower ground, and contribute to the fertility of the hop-gardens in which much of it is laid out. The windings of the Stour through the lower part of the hollow, and the successive islets which it forms in its progress, give much additional beauty to the vicinity of the city.

Ever since the arrival of St. Augustine, in 597, Canterbury has been the ecclesiastical capital of England. It was, however, before this period the chief town of the Saxon kingdom of Kent, which had been founded about the middle of the preceding century by Hengist. Ethelbert, the Kentish King, resided here when Augustine and his monks came over; and the missionaries naturally fixed their head-quarters at the seat of the court. The city lost its secular pre-eminence on the consolidation of all England into one kingdom in the beginning of the ninth century; but the revolutions of twelve hundred years have left it still the metropolis of the national church.

Like most of our other considerable towns, Canterbury was anciently surrounded with walls, the remains of which still exist. All the gates have now been taken down except Westgate, being that which forms the entrance into the city from London, and terminates the principal street, at this part called St. Peter's Street. From this point the street, taking the name of High Street in its middle part, and of St. George's Street beyond that, runs through the heart of the town in a south-easterly direction, forming part of the great road from London to Dover. The old Roman road from Dover across the island to Chester seems to have taken a line nearly parallel to this, but between two and three hundred yards to the south of it, where its course is still marked by the street called Watling Street, part of which is without and part within the walls. Besides the principal branch of the river which skirts the north-west part of the city wall, being crossed by a bridge at Westgate, another branch of it runs up through the western portion of the town, being traversed by another bridge called Eastbridge where it meets the High Street. Parallel to the southern portion of this latter branch, and a little to the east of it, lies the street called Stour Street, thus dividing the southern half of the city into two nearly equal quadrants, or quarters of a circle. Among the other principal streets are Castle Street, to the east of this and nearly parallel to it, and Burgate Street, to the north of St. George's Street, and extending in the same direction with it and High Street. There are numerous short and narrow lanes in all parts of the city, one of which, Mercery Lane, on the north side of High Street, is traditionally said to have been the usual resort of the numerous pilgrims, who, in ancient times, were wont to throng from all parts of the world to Canterbury, in order to pay their devotions at the various shrines in the cathedral, and especially at that of Thomas a Becket, for some ages the most popular saint in the Romish calendar. Thus Chaucer sings,—

> "And specially from every shire's end
> Of Engle-land to Canterbury they wend,
> The holy blissful martyr for to seek
> That them hath holpen when that they were sick."

In this lane several of the adjacent tenements seem anciently to have formed only one house, or large inn. But the same appearances present themselves also in other parts of the city; and doubtless there were large inns elsewhere as well as in this short lane, which, if it had been entirely devoted to that purpose, certainly could not have nearly lodged the whole crowd of pious strangers, which in those days Canterbury usually contained.

Mercery Lane, however, may probably have anciently been the favourite and most honourable place of resort for this description of visitors, as being the avenue leading to the cathedral and its holy precinct. These venerable buildings occupy nearly the whole of the north-eastern quarter of the city, forming a large enclosure, the entrance to which, called the Precinct Gate, is at the termination of Mercery Lane, although a more spacious approach to it has lately been formed by a new opening from the High Street. An account will be given of the Cathedral in a future Number.

At the south-west extremity of the city stand the ruins of Canterbury Castle, a structure which when entire seems to have a good deal resembled the Castle of Rochester, of which we lately gave a notice. The great tower, or Donjon Keep, is the principal part now remaining. A little to the east, and also adjacent to the city wall, is a considerable conical elevation called the Dungil, or Dane John Hill, which, in all probability, was also formerly the site of a castle or other place of strength. The mount and the surrounding ground, however, have now been planted and converted into public walks which are much frequented by the inhabitants.

The entire circuit of the walls is about a mile and three-quarters in length, the space which they inclose forming an irregular circle. But the suburbs extend to a considerable distance beyond the walls, both in the line of the High Street, and to the north-east and the south-west. Some of the most interesting of the antiquities of Canterbury lie without the walls, especially the extensive ruins of St. Augustine's monastery, which are to the north of the Dover road, and the church of St. Martin beyond them. The monastery will be afterwards noticed more at length. St. Martin's church, which is built of Roman brick, is supposed by some antiquaries to have been erected so early as the second century, and to have been one of the churches of the British Christians in the times of the Roman government. It is stated by Bede to have been standing when Augustine came over, and to have been the first church in which he and his monks performed the services of religion

[To be continued.]

Attachment of a Pariah Dog.—The following interesting anecdote is taken from the late Bishop Heber's "Journal of his Travels in India.' " One of my followers, a poor Pariah dog, who had come with us all the way from Bareilly, for the sake of the scraps which I had ordered the cook to give him, and, by the sort of instinct which most dogs possess, always attached himself to me as the head of the party, was so alarmed at the blackness and roaring of a stream we had to cross, that he sat down on the brink, and howled piteously when he saw me going over. When he found it was a hopeless case, however, he mustered courage and followed. But on reaching the other side, a new distress awaited him. One of my faithful sepoys had lagged behind as well as himself, and when he found the usual number of my party not complete, he ran back to the brow of the hill and howled, then hurried after me as if afraid of being himself left behind, then back again to summon the loiterer, till the man came up, and he apprehended that all was going on in its usual routine. It struck me forcibly, to find the same dog-like and amiable qualities in these neglected animals, as in their more fortunate brethren of Europe. The dog had, before this, been rather a favourite with my party, and this will, I think, establish him in their good graces." When it is remembered that the Pariahs themselves, the rejected of all castes, are treated more like dogs than human beings, the reader will comprehend what sort of treatment their poor dogs are likely to receive from the prejudiced natives.

Blindness of Passion, or Mistakes of a Kamtschatkan Bear.—Fish, which forms their chief nourishment, and which the bears procure for themselves in the rivers, was last year excessively scarce in Kamtschatka. A great famine consequently existed among them, and, instead of retiring to their dens, they wandered about the whole winter through, even in the streets of the town of St. Peter and St. Paul. One of them finding the outer gate of a house open, entered, and the gate accidentally closed after him. The woman of the house had just placed a large tea-machine, full of boiling water, in the court; the bear smelt to it and burned his nose: provoked at the pain, he vented all his fury upon the kettle, folded his fore-paws round it, pressed it with his whole strength against his breast to crush it, and burned himself, of course, still more and more. The horrible growl which rage and pain forced from him brought all the inhabitants of the house and neighbourhood to the spot, and poor bruin was soon dispatched by shots from the window. He has, however, immortalized his memory, and become a proverb amongst the town's-people, for when any one injures himself by his own violence, they call him "the bear with the tea-kettle."—*Captain Kotzebue's New Voyages Round the World in the Years* 1823—1826.

Velocity and Magnitude of Waves.—The velocity of waves has relation to their magnitude. Some large waves proceed at the rate of from thirty to forty miles an hour. It is a vulgar belief that the water itself advances with the speed of the wave, but in fact the *form* only advances, while the *substance*, except a little spray above, remains rising and falling in the same place, according to the laws of the pendulum. A wave of water, in this respect, is exactly imitated by the wave running along a stretched rope when one end of it is shaken; or by the mimic waves of our theatres, which are generally the undulations of long pieces of carpet, moved by attendants. But when a wave reaches a shallow bank or beach, the water becomes really progressive, because then, as it cannot sink directly downwards, it falls over and forwards, seeking its level. So awful is the spectacle of a storm at sea, that it is generally viewed through a medium which biases the judgment; and, lofty as waves really are, imagination makes them loftier still. No wave rises more than ten feet above the ordinary level, which, with the ten feet that its surface afterwards descends below this, gives twenty feet for the whole height, from the bottom of any water-valley to the summit. This proposition is easily proved, by trying the height upon a ship's mast at which the horizon is always in sight over the tops of the waves; allowance being made for accidental inclinations of the vessel, and for her sinking in the water to much below her water-line at the instant when she reaches the bottom of the hollow between two waves. The spray of the sea, driven along by the violence of the wind, is of course much higher than the summit of the liquid wave; and a wave coming against an obstacle, may dash to almost any elevation above it. At the Eddystone Lighthouse, when a surge reaches it, which has been growing under a storm all the way across the Atlantic, it dashes even over the lantern at the summit.—*Arnott's Elements of Physics.*

PALMYRA.

The ancient world has left us nothing more extraordinary than this city of the desert. Unrivalled in extent and in magnificence, the ruins of Palmyra rise in the midst of a vast ocean of sand, on which there is scarcely discernible a track of human footsteps. On the north-east the uninhabited waste extends to the Euphrates, the nearest point of which is 60 English miles distant. To the north and the west there is scarcely even a village of mud hovels within the same distance; and nothing, except two or three such miserable resting-places of the wild and roving Arabs, nearer than Aleppo, 180 miles to the north-west, or Damascus to the south-west, almost as far off. The nearest ports on the Mediterranean are Tripoli, Bairoot, Sidon, and Tyre, all nearly due west, but none of them nearer than Aleppo. To the south again all is desert for many hundreds of miles.

The history of Palmyra is as singular and mysterious as its situation. We are told in the 9th Chapter of the First Book of Kings, that " Solomon built Gezer, and Bethhoron the nether, and Baalath, and Tadmor in the wilderness." Tadmor is in all probability Palmyra. This is distinctly affirmed by Josephus. The two names also appear to be the same; for Tadmor is derived from a Hebrew root signifying a palm-tree, and Palmyra appears to have the same origin. We know that the city anciently stood in the midst of a grove of palms. But the strongest confirmation of the assertion of Josephus is found in the fact, that to this day Tadmor, or rather Thedmor as they pronounce it, is the only name by which Palmyra is known among the Arabs. It is so called, and, as far as can be ascertained, has always been so called, by the tribe who claim possession of it, and who have taken up their abode among the ruins.

Solomon flourished a thousand years before the birth of Christ, and the foundations of Palmyra, therefore, if this supposition be correct, must have been laid more than 2800 years ago. Vestiges of the past still remain, which go to vindicate the claim of the city to this high antiquity. Besides the vast relics of an age of the most sumptuous architecture crowding the spot, there are in many places to be observed the ruins and rubbish of more ancient buildings, now for the most part forming merely ridges of shapeless hillocks covered with grass or sand. These are, perhaps, the foundations of the houses of old Tadmor, which a chronicler of the middle ages, probably on some authority which is now lost, affirms was sacked and overthrown by Nebuchadnezzar 400 years after it had been built by Solomon.

In course of time the city appears to have recovered from this disaster, and to have become again great and wealthy. It was probably built by Solomon to serve as an intermediate station for facilitating the intercourse between Judæa and India; and, situated as it was, it no doubt owed its flourishing condition in after times to its Indian trade. Scarcely anything of its history, however, is known down to a comparatively recent period. It is first expressly mentioned as having, in the century before the birth of Christ, been plundered by Marc Antony, on the pretence that it had given aid to the Parthians, against whom he was then carrying on war. Its wealth, however, is stated to have been the real crime which drew upon it the observation of this needy, rapacious, and

profligate soldier. But the booty he actually obtained was very trifling; for the inhabitants, having had timely notice of his intention, had contrived before his arrival to remove their treasures and most valuable effects beyond the Euphrates. From all this it would appear that although, from some inscriptions which remain, it may be conjectured that Palmyra had submitted to Alexander or his successors, it was now considered to be an independent city. Appian, who relates the transaction, expressly says that its inhabitants had acquired their riches by selling the merchandise of India and Arabia to the Romans.

After this we hear no more of Palmyra till towards the close of the third century of our era. It then makes a conspicuous figure for a few years during the reigns of the Roman emperors Gallienus and Aurelian. We must refer the reader to Gibbon's eleventh chapter for the story of its famous queen, Zenobia, who, after attempting to resist the arms of Rome, and assuming the title of Empress of Palmyra and the East, was attacked in her capital by Aurelian, taken captive, brought home by her conqueror to Italy, and forced to walk in his triumphal procession. This catastrophe extinguished for ever the glory of the City of the Desert. Although it had made an obstinate defence, it was, on its surrender, treated with lenity by Aurelian; but he had not long set out on his return home, when the inhabitants rose upon the garrison he had left in the city, and put them all to death. The emperor had already crossed the Hellespont when he received this intelligence. "Without a moment's deliberation," says Gibbon, "he once more turned his face towards Syria. Antioch was alarmed by his rapid approach, and the helpless city of Palmyra felt the irresistible weight of his resentment. We have a letter of Aurelian himself, in which he acknowledges that old men, women, children, and peasants, had been involved in that dreadful execution which should have been confined to armed rebellion; and although his principal concern seems directed to the re-establishment of a Temple of the Sun, he discovers some pity for the remnant of the Palmyrenians, to whom he grants the permission of rebuilding and inhabiting their city. But it is easier to destroy than to restore. The seat of commerce, of arts, and of Zenobia, gradually sunk into an obscure town, a trifling fortress, and at length a miserable village." A few years afterwards, the Emperor Diocletian appears to have erected some buildings at Palmyra, the ruins of one of which, bearing the only Latin inscription in the place, are still standing. Justinian, also, in the sixth century, after it had been for some time quite deserted, repaired its walls, and placed a garrison in it; but not regaining its ancient trade, its only means of existence, its temples and columned porticos were probably soon after left once more to the winds and the beasts of prey.

For more than a thousand years after the time of Justinian, the history of Palmyra is again nearly an utter blank. A Jewish writer, called Benjamin Tudelensis, says that he was there in 1172, and that he found the place inhabited by about two thousand of his countrymen. The Arabian geographer Abulfeda also mentions it in 1321, under the name of Tedmor. But in Europe its existence would seem to have been quite forgotten, till, in the year 1678, some English merchants of the factory at Aleppo received from the natives of the country such an account of the ruins as determined them to attempt a visit to the spot. They set out accordingly, on the 18th of July that year; but although they reached Palmyra, they deemed it prudent, from the threatening attitude of the Arabs, to return almost immediately, taking time to copy only one inscription. No second attempt was made till 1691, when some English residents at Aleppo again set out for the place on the 30th of September, and reached it after what the Rev. William Halifax, who was one of the party, calls "six easy days' travel." They remained for four days, "having," says one of them, whose journal of the expedition has been printed, "tired ourselves with roving from ruin to ruin, and rummaging among old stones, from which little knowledge could be obtained." This writer gives no further account of what he saw, his whole narrative being occupied with the events of the journey; but fortunately some of his companions did not hold "old stones," and the knowledge to be derived from them, in such contempt. In the 'Philosophical Transactions,' No. 217, being the publication for October, 1695, is given a letter of twenty-eight quarto pages, from Mr. Halifax, containing a very full description of the place; and in No. 218 are printed the journals of both expeditions, occupying thirty-two pages more. The discovery appears to have excited the highest degree of public curiosity. In the same number of the 'Transactions' in which the journals appear is a paper, by the learned astronomer Dr. E. Halley, on the Ancient State of the City of Palmyra, being an able attempt to elucidate its history from the inscriptions which the discoverers had brought away with them. Prefixed to the journal is also given an engraved representation of the ruins from a sketch taken by one of the second party. This plate is erroneously called "A View taken from the Southern Side," while it is, in point of fact, a view from the north. The same plate is given, with the error uncorrected, in both the first edition, published in 1696, and the second, published in 1705, of Abraham Sellers's volume entitled 'The Antiquities of Palmyra, alias Tadmor, built by King Solomon, &c.'

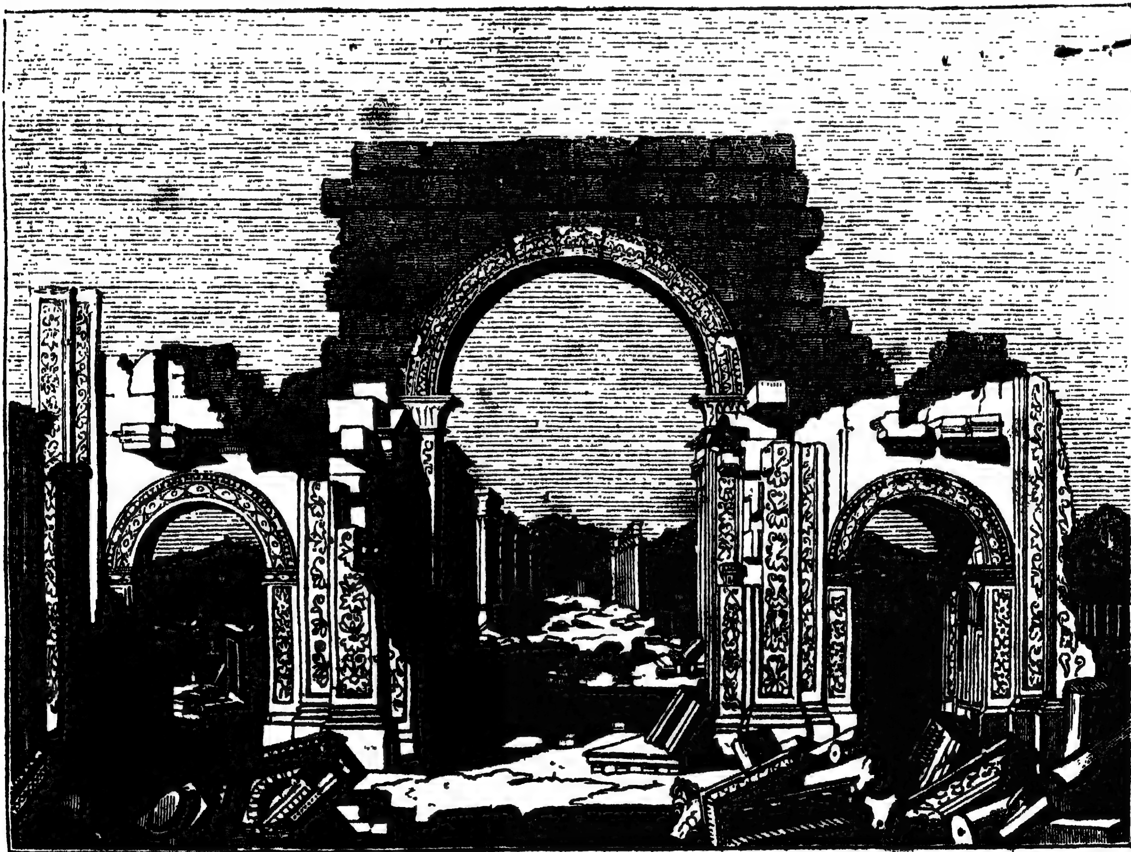
After this Palmyra was visited by Bruyn, Maundrel, and other oriental travellers; but the journey that has done most for the illustration of its antiquities, is that which was undertaken in 1751, by Messrs. Wood, Bouverie, and Dawkins, accompanied by the Italian draughtsman, Borra. The results of their investigations were published at London, in 1753, in a magnificent folio volume, bearing the title of 'Ruins of Palmyra, otherwise Tedmor,' and consisting principally of fifty-seven plates, finished in the highest style of art.

The travellers left their ship at Bairoot, on the coast of Syria, and crossing Mount Libanus to Damascus, proceeded thence to Hassia, a village four days' journey to the north, from the Aga of which, whose jurisdiction was found to include Palmyra, they received an escort of horse, under whose protection they pursued the remainder of their journey. They left Hassia on the 4th of March, and reached Palmyra on the 13th. Their approach to the ruins was from the south-west, through a sandy plain, about ten miles in breadth, and unenlivened by either tree or water. On both sides rose barren hills, forming the horizon. About two miles before reaching Palmyra, the hills seemed to join; and upon coming up, it was found that a narrow valley led to the city. Ancient and singularly-fashioned sepulchres rose here and there on each hand, and occupying the hollow of the valley were the ruins of an aqueduct which had formerly conveyed water to Palmyra. Immediately after, the city itself burst upon their view. "We had scarce passed these venerable monuments," says Mr. Wood, "when the hills opening, discovered to us all at once the greatest quantity of ruins we had ever seen, all of white marble; and beyond them, towards the Euphrates, a flat waste as far as the eye could reach, without any object that showed either life or motion. It is scarce possible to imagine anything more striking than this view: so great a number of Corinthian pillars, mixed with so little wall or solid building, afforded a most romantic variety of prospect."

The highest hills in the neighbourhood of Palmyra

are on the west and the north-west; but the city itself stands on ground somewhat elevated above the extensive plain which stretches around its other sides. In Mr. Wood's work is given a general view of the ruins from nearly the same point from which that in the 'Philosophical Transactions' must have been taken, namely, from the north-east. The persons who visited the city in 1678 had found in the neighbourhood "a garden full of palm-trees;" but Mr. Wood and his companions did not see a single palm remaining. The principal part of the ruins is enclosed by a wall, greatly decayed, and in some places barely traceable, being probably that erected by Justinian. Its circuit is about three English miles. On a height beyond it to the north-west is a tower, which is said to have been erected by an Arab chief about the end of the sixteenth century. On the lower grounds, in all directions, are seen the tombs mentioned above, which are tall square towers; such of them as have been explored containing mummies, exactly resembling those of Egypt, and being in general elaborately adorned in the interior, like the sepulchres in that country. Occupying a small space around the eastern extremity of the ruins, are some olive and corn-fields, divided from each other by enclosures of mud. "Almost the whole ground within the walls," says Mr. Wood, "is covered with heaps of marble." The Arabs say that the ancient city extended far beyond the limits of the present walls, its circumference being fully ten miles. Wherever the ground is dug up within that space, the ruins of buildings, they assert, are found. The fame of the founder of Tadmor still flourishes among its ruins. "All these mighty things," said the Arabs to Mr. Wood, "Solyman ebn Doud (Solomon the son of David) did by the assistance of spirits."

The ruins extend from the south-east to the north-west, in an unbroken line of nearly a mile and a half in length. At the eastern extremity stands the most magnificent building of the whole, that which is supposed to have been the Temple of the Sun. We shall give a description of this noble ruin, accompanied with a view, in our next Number. The enclosed court around the temple is a square, each side of which is 660 feet in length, the great gate of entrance being to the west. It is within this court that the tribe of Arabs who occupy the place have erected their mud cottages, to the number of thirty or forty. To the west of the temple is a Turkish mosque, in ruins too, like the more ancient structures around it. A little way beyond this, in the same direction, is the stately arch, of which, as seen from the east, a representation is given, from Mr. Wood's book, at the end of this notice. This is the entrance to a portico which extends in a north-west direction for the amazing length of nearly 4000 feet, till it terminates at the sepulchre. The columns of which it was formed, some entire and erect, others broken or prostrate, or both, are strewed over the whole of this long line. Among the other buildings is one which had been a Christian church. Another, a little to the west of that, consists of four immense columns, towering to a height far above everything around, and surmounted by an entablature of surpassing richness. The building, which appears from the inscription on it to have been erected by Diocletian, is near the north-western termination of the vast field of ruins.



[Arch at Palmyra.]

, The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.

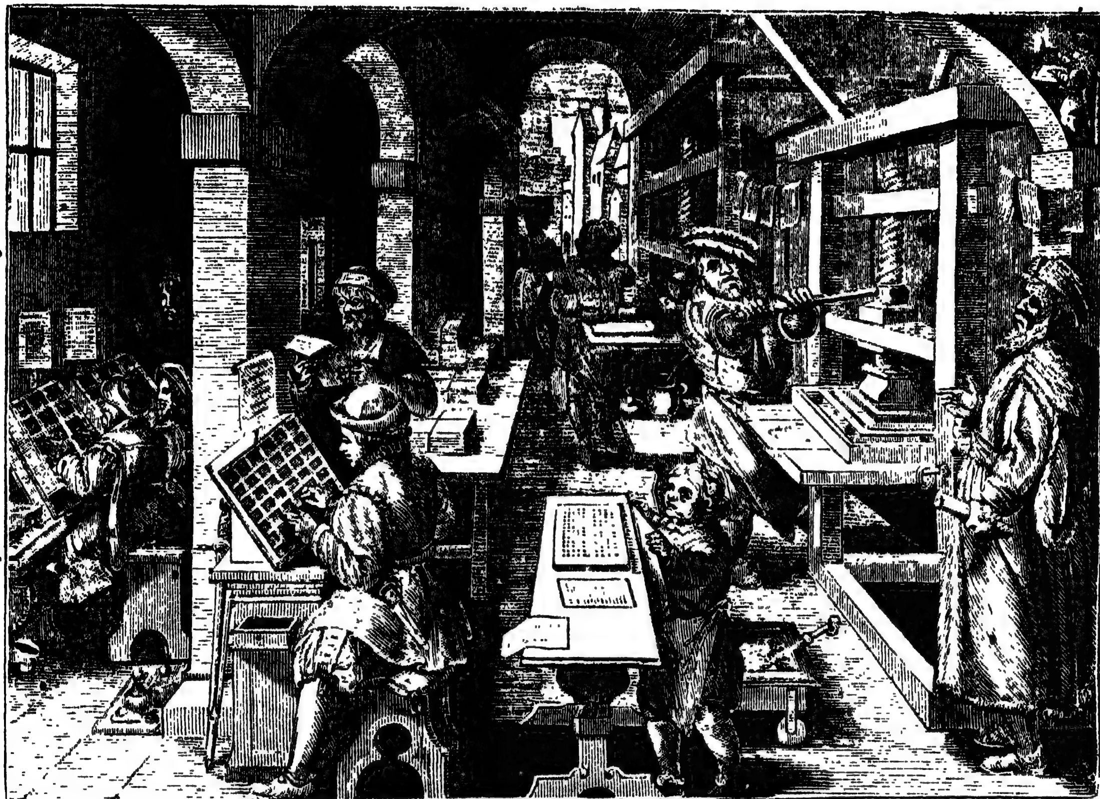
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THE COMMERCIAL HISTORY OF A PENNY MAGAZINE.—No III.

COMPOSITORS' WORK AND STEREOTYPING.



[Ancient View of a Dutch Printing-Office.]

In a very curious set of prints by L. Galle, after the designs of Stradanus, a painter who flourished in the latter end of the sixteenth century, are represented many operations in the arts, as they were practised at that period. We have copied, as above, his view of a printing-office. On the right is the master printer, a grave, bearded personage, dressed in a fur-trimmed robe, apparently giving some directions to his workmen. These consist of several compositors, comfortably seated on cushioned stools; the dirk of one is in a sheath by his side, and the sword of another rests against a column. This ancient privilege of the compositors of all countries to wear swords still forms a matter of pride with the printers of the present day; for it affords a proof that their art was considered a liberal one, and that men of birth and education were accustomed to practise it. The printers of Paris were thus authorized to wear swords by a royal ordinance of 1571. The costume must have strangely contrasted with the paper cap which the printers of Paris then wore, and which they still wear. Near one of the compositors in our print is an old man in spectacles, who is probably engaged in the business of a reader, which we shall have to explain. The men at work at the two rude presses, the further one inking the types, and the other pulling down the screw which gives the impression, exhibit the mode then employed to work off the sheets, which must have been particularly slow. To this we shall advert when we come to speak of the printing press and the machine. Altogether this print appears to show that, in the ancient printing-offices, there were few mechanical aids to labour; and we may infer that the compositors especially, comfortably seated, and somewhat luxuriously clothed, were not much affected by that spirit of restless activity which distinguishes a modern printing-office.

There is a well-authenticated story of an English clergyman, who taught himself the printing art, and carried it on with a persevering devotion to one object, of which we have no other example. This good man had projected a complete body of divinity in a great many volumes. He proposed his scheme to several publishers, but they all rejected it. He then caused copies of several volumes to be printed by subscription. This undertaking failed. He was determined, however, that his literary labours should not be deprived of that chance of immortality which the printing-press, to a certain extent, can bestow. He bought a few types, enough to set up two pages, and thus scantily provided, he undertook the wonderful task of printing, not a small tract, or even one goodly volume, but a great number of volumes. When his two pages were arranged, he printed off fourteen copies at a little press which he had established in his house. The types were then broken up to allow him to print the two next pages; and thus with a tortoise pace he printed away for some twenty years, and at last completed his work in twenty-six volumes.

A copy of this remarkable production is said to exist in the British Museum, and the story, with all its details, may be found in the 'Pursuit of Knowledge under Difficulties.'

The reader will at once comprehend, from this story, that the setting up of types, one by one, so as to produce syllables, words, sentences, paragraphs, chapters, and books, is essentially a slow operation,—a much slower operation than copying with a pen,—an operation which would be worthless except it were possible and desirable to produce many copies from the types thus set up. Taking the labour of the clergyman as worth fifty pounds a year, his work for twenty years would amount to one thousand pounds, and therefore each of his six copies cost more than one hundred and fifty pounds. If he had applied the same manual labour to any ordinary art, such as shoemaking for instance, in which manual labour is not much assisted by the division of employments and mechanical aids, he would probably have added a thousand pounds to the wealth of the community. As it was, he only amused himself.

The slow and profitless toil of this harmless recluse presents a striking contrast to the intense energy displayed in a large London printing office. There are several establishments of this nature in which, we have no hesitation in saying, the division of labour is brought to such perfection, that a volume or volumes, containing as many words as the clergyman's thirty volumes, and, therefore, requiring as much of the compositor's labour, could be printed in a week. In this respect nothing is more remarkable than the extraordinary rapidity with which the bills and reports of the House of Commons are printed by Messrs. Hansard. We have before us the first Report of the Commissioners of Factories Inquiry. It contains about 1200 folio printed pages. Each page holds upon an average 72 lines of 15 words each, or 72 lines of 80 letters; so that the volume contains 1,296,000 words, or 6,912,000 letters. A good compositor can pick up about 15,000 letters in a day, so that it would take one compositor 460 days to produce the text of this volume. But, in addition to this, there are the side notes of the Report, which would occupy at least a fourth more of the time; making the total time that it would occupy one compositor to produce this book, 600 days, or two working years. This Report was ordered by the House of Commons to be printed on the 28th of June, and was laid complete upon the table of the House, about the 10th of July—in less than a fortnight. Such haste does not involve any necessary want of accuracy. These wonderful effects are produced by a perfect division of labour, in which there is activity without hurry, and in which the superintending mind is the moving and regulating power of a human machine, composed of many parts, but all working in harmony to the same end.

Let us now examine a printing office a little more in detail. In Mr. Clowes's establishment, which we noticed in our last Number, we enter a very long room, in which from fifty to sixty compositors are constantly employed. Each man works at a sort of desk called a frame, and in most instances he has the desk or frame to himself. The frames project laterally from the wall;—at intervals there are large tables with stone tops, technically called imposing stones. The visitor will see no presses in the room with the compositors, as in the old Dutch print. These branches of business are separated, for the pressman pursues a noisy vocation, while the compositor is, or ought to be, silent. The one press in the composing-room is merely for taking off proofs. Nor will the visitor see any old gentleman in spectacles occupied merely in reading. The business of a reader requires even more silence than that of a compositor, and he, therefore, has a closet to himself. The workmen in each frame are by no means so dingy in their appearance as some people think, when they call all printers by the name which from time immemorial has been bestowed upon the errand-boy of the office. Everybody has heard of the printer's devil,—that

"Young thing of darkness, seeming
A small poor *type* of wickedness *."

But the compositors have nothing to say to this title, any more than they have to the swords and the pedigrees of the labourers in the offices of the Alduses and the Stephenses. They are cleanly, well-dressed, intelligent-looking, active artisans; not much thinking about the matter of the work they have in hand, but properly intent upon picking up as many letters in the hour as may be compatible with following their copy correctly, and of producing what is called a clean *proof*,—that is, a proof, or first impression, with very few mistakes of words or letters.

Each *frame*, at which a compositor works, is constructed to hold two pair of *cases*. Each pair of cases contains all the letters of the alphabet, whether small letters or capitals, as well as points, figures, &c., &c. One of these pair of cases is occupied by the *Roman* letters, the other by the *Italic*. The upper case is divided into ninety-eight partitions, all of equal size: and these partitions contain two sets of capital letters, one denominated "full capitals," the other "small;" one set of figures; the accented vowels; and the marks of reference for notes. The lower case is divided into partitions of four different sizes; some at the top and ends being a little smaller than the divisions of the upper case; others nearer the centre being equal to two of the small divisions; others equal to four; and one equal to six. In all there are fifty-three divisions in the lower case. The inequality in the size of the cells of the lower case is to provide for the great differences as to the quantity required of each letter. According to the language in which it is used, one letter is much more frequently wanted than another; and the proportions required of each have been pretty accurately settled by long experience. As some of our readers may be curious to know these proportions as they apply to the English language, we subjoin the type-founder's scale for the small characters of a fount of letter of a particular size and weight:

a	8500	h	6400	o	8000	v	1200
b	1600	i	8000	p	1700	w	2000
c	3000	j	400	q	500	x	400
d	4400	k	800	r	6200	y	2000
e	12000	l	4000	s	8000	z	200
f	2500	m	3000	t	9000		
g	1700	n	8000	u	3400		

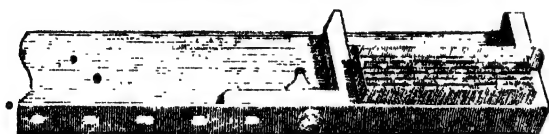
The proportion in which a particular letter is required, renders it necessary that the cells of the lower case should be arranged, not as the letters follow each other alphabetically, but that those in most frequent use should be nearest the hand of the compositor. The point to which he brings the letters, after picking them up out of their cells, is not far removed from the centre of the lower case; so that in a range of about six inches on every side, he can obtain the c, d, e, i, s, m, n, h, o, p, u, t, a, and r, the letters in most frequent use. The spaces, which he wants for the division of every word, lie close at his hand at the bottom of the central division of the lower case. It must be quite obvious that the man who contrived this arrangement saved a vast deal of time to the compositor. We see in the old Dutch print that the cases are divided into equal compartments; so that it is probable that this ingenious principle was not introduced amongst the early printers. We have always observed that a stranger to the art is surprised at the accuracy with which a compositor dips his fingers into the box containing the letter which he requires. This surprise is generally connected with an opinion,

* 'London Magazine.' 1823.

that the compositor would do his work more correctly if the boxes were labelled. A very inexpert performer upon the piano will, nevertheless, strike any one of the seventy-eight notes without making a mistake; and in the same way the youngest boy of a printing-office very soon learns the places of the letters without any difficulty.

Let us now for a little while follow the compositor in the progress of his work.

Standing before the pair of cases which contain the Roman letter, he holds in his left hand what is called a *composing-stick*. This is a little iron or brass frame, one side of which is moveable, so that it may be adjusted to the required width of the page or column which the workman has to set up. It is made perfectly true and square; for without such accuracy the lines would be of unequal length. It is adapted to contain not more than about twelve lines of the type of the 'Penny Magazine.' This little instrument is represented in the cut below.



[Composing-Stick.]

The copy from which the compositor works rests upon the least-used part of the upper case. The practised compositor takes in a line or two at a glance, always provided the author writes an intelligible hand,—which virtue is by no means universal. One by one, then, the compositor puts the letters of each word and sentence into his stick, securing each letter with the thumb of his left hand, which is therefore continually travelling on from the beginning to the end of a line. His right hand goes mechanically to the box which he requires; but his eye is ready to accompany its movements. In each letter there is a nick, or nicks, which indicates the bottom edge of the letter: and the nick must be placed outwards in his composing-stick. Further, the letter must also be placed with the face upwards, so that two right positions must be combined in the arrangement of the types. If the compositor were to pick up the letter at random, he would most probably have to turn it in his hand; and as it is important to save every unnecessary movement, his eye directs him to some one of the heap which lies in the right position, both as regards the face being upwards and the nick being outwards. This nick is one of those pretty contrivances for saving labour which experience has introduced into every art, and which are as valuable for diminishing the cost of production as the more elaborate inventions of machinery. When he arrives at the end of his line, the compositor has a task to perform, in which the carefulness of the workman is greatly exhibited. The first letter and the last must be at the extremities of the line: there can be no spaces left in some instances, and no crowding in others, as we see in the best manuscript. Each metal type is of a constant thickness, as far as regards that particular letter; though all the letters are not of the same thickness. The adjustments, therefore, to complete the line with a word, or, at any rate, with a syllable, must be made by varying the thickness of the spaces between each word. A good compositor is distinguished by uniformity of spacing: he will not allow the words to be very close together in some instances, or with a large gap between them in others. His duty is to equalize the spacing as much as he possibly can; and this is, in some cases, very troublesome. When the workman has *filled his stick*, as it is called,—that is, has set up as many lines as his stick will conveniently hold,—he lifts them out into what is termed a *galley*, by grasping them with the fingers of each hand, and thus taking them up as if they were a solid piece of metal. The facility with which some compositors can lift about what is called a *handful* of moveable type, without deranging a single letter, is very remarkable. This sort of skill can only be attained by practice; and thus one of the severest mortifications which the printer's apprentice has to endure, is to toil for an hour or two in picking up several thousand letters, and then see the fabric destroyed by his own clumsiness, leading him to mourn over his heap of broken type,—technically called *pie*,—as a child mourns over his fallen house of cards.

Letter by letter, and word by word, is the composing-stick filled; and by the same progression the galley is filled by the contents of successive sticks. In the instance of the 'Penny Magazine,' and in that of newspapers and most other periodical works, a proof is taken before the types are made up into pages. In books, however, when the compositor has set up as many lines as fill a page, he binds them tightly round with cord, and places them under his frame. We need scarcely say that the sizes of books greatly vary; but they are all reducible to a standard determined by the number of leaves into which a sheet of paper is folded. The most common size is called *octavo*, the size of the 'Library of Useful Knowledge,' and this contains 16 pages to the sheet: the next is *duodecimo*, the size of the 'British Almanac,' containing 24 pages to a sheet; and the next *octodecimo*, or eighteens, containing 36 pages in a sheet, which is the size of Miss Martineau's 'Illustrations of Political Economy.' There are many other sizes, such as the larger *quarto*, and the smaller *twenty-fours*. In every case when a sheet or sheets is complete, the compositors arrange the pages in proper order upon the imposing stone; surround each page with pieces of wood called *furniture*, so as to leave an equal margin to every page; and, finally, wedge the whole tightly together in a stout iron frame, called a *chase*. If the work is properly executed, the pages thus wedged up, constituting one side of a sheet, termed a *form*, are perfectly tight and compact; and the *form* may be carried about with as much ease as if it were composed of solid plates, instead of being formed of 40,000, or 50,000, or even 100,000 moveable pieces.

Whether the lines which a compositor sets up are made into pages, and *imposed* as a sheet, or whether a proof is taken of them in an earlier stage, such as we have described to be the process in the 'Penny Magazine,' the business of the *reader* commences immediately after that of the compositor. No one unacquainted with the details of a printing-office can conceive the great differences between the correctness of one compositor and of another. The differences in the talent, the acquired knowledge, and even the moral habits of different men, are the causes of these remarkable variations. A *proof* shall be brought to the reader produced by the joint labour of two or three compositors of different degrees of merit. In a particular part of it he will find one letter constantly substituted for another, although the sense is upon the whole given correctly: this is the work of the careless and slovenly compositor, who does not take the trouble to look over the types as he sets them up line by line. He is a bad economist of his own time; for he has to correct all these faults at last, without making any charge for his corrections; and he corrects them with much less ease in the second stage than in the first. Again, in another part of the proof, although the merely literal faults may be very few, there is a perpetual substitution of one word for another. This is the work of the ignorant or conceited compositor, who jumps at the meaning of his author, and thus contrives to produce the most ludicrous errors in his original proofs, and to insinuate some error or other into the most carefully corrected book. We have seen proofs in which an ode to a Grecian *urn* was translated into an ode to a Grecian *nose*; in which Queen Mab was drawn by a team of

little *attorneys*, instead of the little '*atomies*' of Shakspeare; and the *aromatic* principles of the English constitution, instead of the *democratic*, made us think of a Persian court, rich with all delicate odours, instead of the House of Commons and the hustings. Caleb Whiteford, who is celebrated by Goldsmith in his poem of 'Retaliation,' published an amusing collection of 'Mistakes of the Press;' but his most ingenious inventions could not compare to the real blunders which are sometimes offered to the printer's reader. Lastly, the proof may present, and it very often does so, a most favourable specimen of what may be effected by carefulness and good sense. A wrong letter will not occur in twenty lines; a gross mistake never occurs; and, what is still more surprising, while the compositor has been engaged in an operation almost purely mechanical, he will have corrected the generally loose punctuation of the author, and produced a harmony in that most difficult department of literary labour, which is seldom attained except by long experience. Such a compositor is always properly estimated in a printing-office. The best work is generally put into his hands; and he is enabled to execute it with so much facility, that his earnings are often nearly double those of the ignorant and slovenly workman.

We subjoin, what will be useful to many persons, an exemplification of the marks which are used in correcting a printer's proof. The passage furnishing the example may be found in the first number of 'The Commercial History of a Penny Magazine,' page 376, and the reader may amuse himself by comparing the passage, as it is correctly printed, with the following specimen of a printer's bad proof, in which every possible variety of error is introduced:—

1 o/ The prlcess of printing, when compared with that of
writing, is unquestionably a dear process; provided a 2 cheap/
3 copies of sufficient number of any particular book are printed, so 4 #
5 ɔ as to render the pro portion of the first expense upon a 6 ⁀
7 ɡ/ singgle copy inconsiderable. If, for example, it were
required, even at the present moment time, to print a 8 ȣ/
single copy, or even three copies or four, only of any 9 tr
production, the cost of printing would be greater than
10 run on the cost of transcribing.

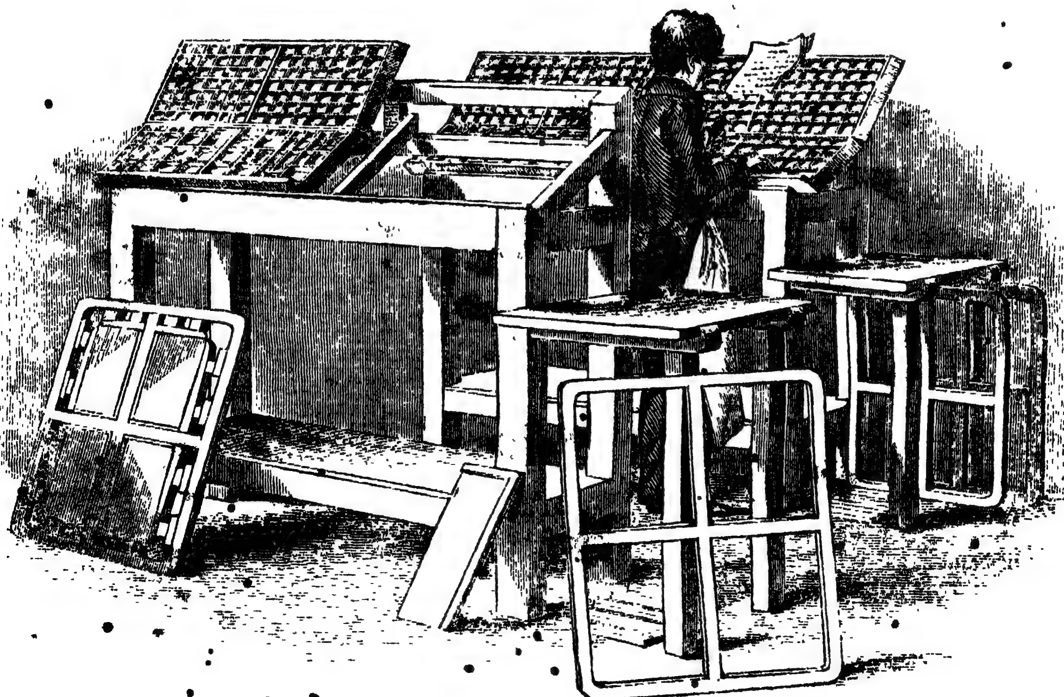
It is when hundreds, and especially thousands, of the 11 ,/
same work are demanded that the great value of the
12 tr/ printing press in making knowledge cheap, is particularly shown. [It is probable that the first printers 13 ⌐/ ¶
did not take off more than two or three hundred, if so
14 ,/ many, of their works and, therefore, the earliest printed
books must have been still dear, on account of the
15 italic/ limited number of their readers. CAXTON, as it appears 16 l.c.
by a passage in one of his books, was a cautious printer; 17 stet/
and required something like an assurance that he should 18 ×/
sell enough of any particular book to repay the cost of
19 ⊙/ producing it In his 'Legends of Saints,' he says, "I 20 s. caps
have submysed (submitted) mysell to translate into
21 '/ English the 'Saints of Legend,' called 'Legenda aurea' 22 tr/
23 caps/ in Latin; and William, Earl of Arundel, sent me a 24 desired me and promised to take a reasonable quantity of them—sent
25 worshipful gentleman, promising that my said lord
should, during my life, give and grant to me a yearly fee, 26 ×
that is to note, a buck in summer and a doe in winter 27 "/

1. Is the mark for changing the wrong letter in the word process.
2. To substitute one word for another.
3. and 24. The first is the method of marking a short insertion, the second of marking a long one.
4. To have a blank space put between the two words.
5. To turn a letter which has been placed upside down.
6. To close the word in which a space has been improperly left.
7. and 8. To take away (*dele*, blot out) a superfluous letter or word.
9. 12. and 22. Different marks for transposing the arrangement of letters, words, or sentences.
10. To have no fresh paragraph.
11. To substitute a comma for a full-point or period.
13. To commence a new paragraph.
14. 19. 21. and 27. To insert points and marks of quotation.
15. To have any particular part printed in Italic.
16. To have words or letters printed in 'lower case,' or small letters; Roman is always understood, unless otherwise directed.
17. To have a word remain, which has been accidentally or erroneously marked. *Stet* is the Latin for "let it stand."
18. Points out a letter which does not match with the others; a 'wrong fount.'
20. and 23. To have certain parts printed in small or full capitals.
25. To set straight whatever may stand crooked.
26. To remove the unnecessary black mark between the words, which arises from what should form the space not having been pushed down.

When the ordinary reader of a newspaper, or of a book, meets with an occasional blunder either of a letter or a word, he is apt to cry out upon the carelessness with which the newspaper or book is printed. It is in the very nature of the process of producing words and sentences by the putting together of moveable types, that a great many blunders should be made by the compositor in the first stage, which nothing but the strictest vigilance can detect and get rid of. The ordinary process of correction is for the printer's reader to look upon the proof, while another person, generally a boy, reads the copy aloud. As he proceeds the reader marks, in the manner just shown, all the errors which present themselves upon a first perusal. The proof then goes back to the compositor; and here a business of great labour and difficulty ensues. The omitted words and letters have to be introduced, and the incorrect words and letters have to be replaced by the correct. The introduction of two or three words will sometimes derange the order of a dozen lines; and the omission of a sentence will involve the re-arrangement of many pages. In this tedious process new blunders are oftentimes created; and these again can only be remedied by after vigilance. The first corrections being perfected, the reader has what is called a *revise*. He compares this with his first proof, and ascertains that all his corrections have been properly made. In this stage of the business the proof generally goes to the author; and it is rarely that the most practised author does not feel it necessary to make considerable alterations. The complicated process of correction is again to be gone over. The printer's reader and the author have again revises; and what they again correct is again attended to. The proof being now tolerably perfect, the labour of another reader is in most large establishments called in. It is his business to *read for press*—that is, to search for the minutest errors with a spirit of the most industrious criticism. The author has often to be consulted upon the queries of this captious personage, who ought to be as acute in discovering a blunder, as a conveyancer in finding out a flaw in a title-deed. But in spite of all this activity blunders *do* creep in; and the greatest mortification that an author can experience is the lot of almost every author,—namely, to take up his book, after the copies have gone out to the world, and find some absurdly obvious mistake, which glares upon him when he first opens the book, and which, in spite of his conviction that it was never there before, has most likely escaped his own eye, and that of every other hunter of errors that the best printing-office can produce.

When the sheet is finally corrected for press, the work of the compositor is for a time at an end; but when it is printed off, or when a stereotype cast has been taken from the moveable types, it is a part of his business, and for which he is paid nothing additional, to return the types to the cases from which they were taken. This operation is called *distribution*. It is a most beautiful process in the hands of an expert compositor; and probably no act which is partly mental and partly mechanical offers a more remarkable example of the dexterity to be acquired by long practice. The workman holding a quantity of the type in his left hand as it has been arranged in lines, keeping the face towards him, takes up one or two words between the forefinger and thumb of his right hand, and drops the letters, each into its proper place, with almost inconceivable rapidity. His mind has to follow the order of the letters in the words, and to select the box into which each is to be dropped, while his fingers have to separate one letter from another, taking care that only one letter is dropped at a time. This is a complicated act; and yet a good compositor will distribute three or four times as fast as he composes,—that is, he will, if necessary, return to their proper places 50,000 letters a day. The letters being inverted in printing are not read as they are read in a book, and thus "to know his p's from his q's" is a difficulty to a beginner.

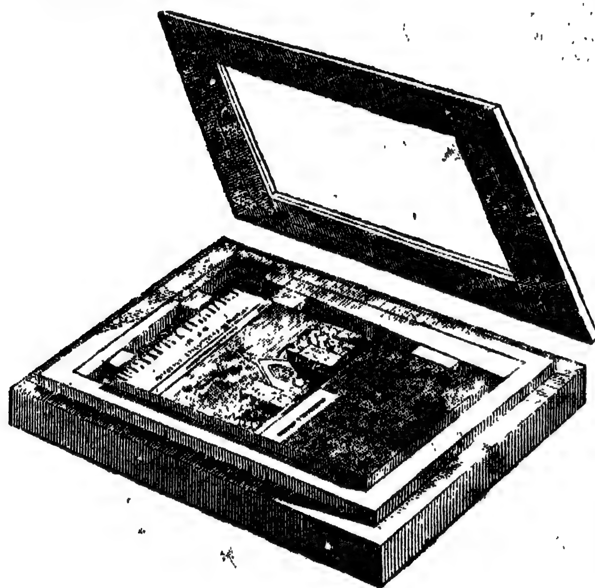
We subjoin a wood-cut which exhibits the compositor composing in his frame, and a second frame which more distinctly shows the shape of a pair of cases. Standing against the empty frame to the left is a form of four folio pages, supposed to represent the form of the 'Penny Magazine:' at the other end of the same frame is an empty chase similar to that in which the pages are wedged up.



[Frames, Cases, &c.]

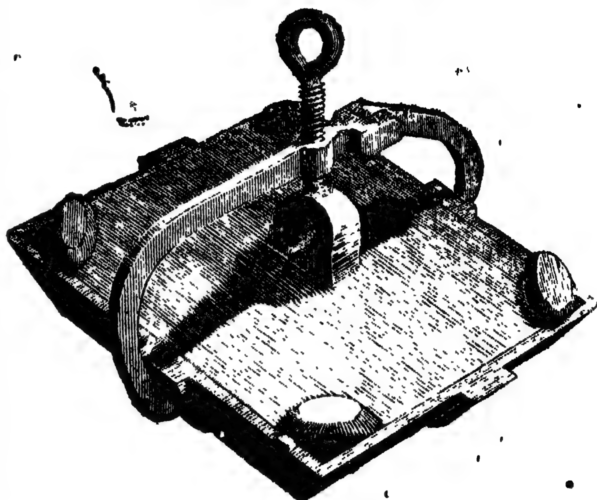
It is in this stage, when the pages of the 'Penny Magazine' have been rendered as correct as the care of several readers can ensure, and when the original wood-cuts have been inserted in their proper places, that the process of *stereotyping* commences. This process is by no means universally applied to all printed books. Its peculiar advantages are confined to works in very large demand, and of which the demand is continued long after the first publication. In the case of the 'Penny Magazine,' there is another great advantage afforded by this process, namely, the facility of procuring several metal copies, or plates, of each number, as we shall presently explain. In the mean time we would direct the reader's attention to a brief account of the process of stereotyping.

The first operation is that of taking a *mould* from each page of moveable types. The pages are not arranged as they would be combined in a sheet, and wedged up together in one iron frame or chase, but each page is put in a separate chase. It is essential that the face of the types should be perfectly clean and dry, and that no particle of dirt or other substance should attach to the bottom of the types, so as to prevent them being completely level upon the surface. The page is now placed upon the lower part of a *moulding-frame*, represented in the following cut:—



[Moulding-Frame.]

The upper part of the frame is somewhat larger than the page, and the margin of mould thus formed determines the thickness of the plate. The types having been previously rubbed over with an oily composition, gypsum (plaster of Paris) is poured evenly over the whole surface. Almost every one knows that this substance, although moulded in a liquid state, sets very quickly, and soon becomes perfectly solid. There is a good deal of nicety required from the workman, not only in forming the mould, but in removing it from the type. If any part of the plaster adheres to the face of the type, the mould is of course imperfect, and the operation must be gone over again. To prevent this, considerable care is required in the preparation of the gypsum, and much neatness of hand in separating the mould from the page. Having been removed and found perfect, it requires some dressing with a knife on its edges, and several notches are cut in the margin to allow the metal to enter the mould. It is now fit for baking. This process also requires a good deal of accurate knowledge. The oven in which the moulds are placed upon their edges must be kept at a very regular temperature; for if it be too hot, the moulds warp. The process of casting begins when the moulds have been baked sufficiently long to be perfectly dry and hard. The *casting-box*, which contains the mould, is represented in the following cut:—



Casting-Box.]

At the bottom of the pot is a moveable plate of cast-iron, called a *floating-plate*; and upon this plate, the face of which is perfectly accurate, the mould is placed with its face downwards. Upon the back of the mould rests the cover of the casting-box, the inside face of whose lid is also perfectly true. The cover is held tightly down upon the mould by a screw, connected with two *shackles*, as shown in the above cut; and also by two *nippers*, belonging to the apparatus for plunging the pot into the metal pit, as shown in the cut of the last page. This apparatus, which is attached to a crane, is so constructed as to swing with a perfectly horizontal motion; and the casting-pot, with the mould, being thus suspended over the metal pit, is gradually forced down into the molten mass, and there kept steady by a lever and weight. The lid of the box, it will be observed, is cut off at the corners; and it is through these spaces that the metal enters the box, and insinuates itself into every hollow. When the box is plunged into the metal, a bubbling noise is heard, which is caused by the expulsion of the air within the box. After having remained immersed for about ten minutes, it is steadily lifted out by the crane, and swung to a cooling trough, in which the under side of the box is exposed to water. Being completely cooled, the caster proceeds to remove the mould from the casting-box. The plaster mould, the plate moulded, and the floating-plate, are all solidly fixed together. The metal, by its specific gravity, has forced itself under the floating-plate, which it has consequently driven tightly up against the ledges of the mould. The mould has in the same way been driven tightly up against the lid of the casting-box. The notches in the ledges of the mould have, at the same time, admitted the metal into the minutest impression from the face of the types. The caster now breaks off the superfluous metal and the ledges of the mould with a wooden mallet, as shown in the wood-cut. The mould is of course destroyed; and if another plate is required, another mould must be taken from the types. After the superfluous metal and the plaster are removed, the stereotype plate comes out bright and well formed. But the plate is not yet complete. Its proper thickness cannot be determined by the mould alone; and the back is therefore turned in a beautifully-contrived lathe, in which the plate revolves against a cutting tool, and a perfectly true surface is obtained by the superfluous parts being cut away in a series of concentric circles. Again, the very best casting cannot prevent occasional defects in the face of the plate. It requires therefore to be minutely examined

by a workman called a *picker*. It is his business to remove the small globules of metal which occasionally fill up such letters as the *a* and the *e*; to insert a new letter, which he can do by soldering, if any one be broken; and, what is a still more delicate operation, to remove with his graver any impurities which fill up the lines of a wood-cut. To execute this latter duty properly, he ought to be in some degree an artist, and possess the keen eye and the steady hand of an engraver.

It will be seen from this imperfect description, that the process of stereotyping is one which demands considerable labour, and occupies a great deal of time. In the various stages of preparing the mould, of regulating the proportions of the metal, of casting the plate, and of subsequently examining and correcting it, much skill and experience are demanded. At the commencement of the 'Penny Magazine,' we had considerable difficulty in procuring clean and sharp impressions of the wood-cuts; partly from the circumstance that the wood-cuts themselves were not well adapted to be moulded, and partly that the composition of the plate-metal was not so well understood as it now is. At present, the workmen in Mr. Clowes's foundry very rarely fail in producing good casts; and the *pickers* have learnt to clear out the filled-up parts of a cast from a wood-cut without injury to its effect. Still the process altogether is tedious and laborious. The reader will have perceived that stereotyping is distinctly superadded to the operation of printing from moveable types. When a *form* is perfectly corrected, it is ready at once to be laid on the press or machine, without any further preparation; but when a mould is to be taken from it, and a plate to be cast from that mould, the moulding and the casting involve so much additional labour and expense. Stereotyping is therefore applicable only in peculiar cases; but in those cases it is so valuable, that it may be pronounced absolutely necessary to the production of cheap books in large numbers, and therefore a most important auxiliary in the diffusion of knowledge by the printing press. Let us follow out this assertion by taking the example of this very Number of the 'Penny Magazine.'

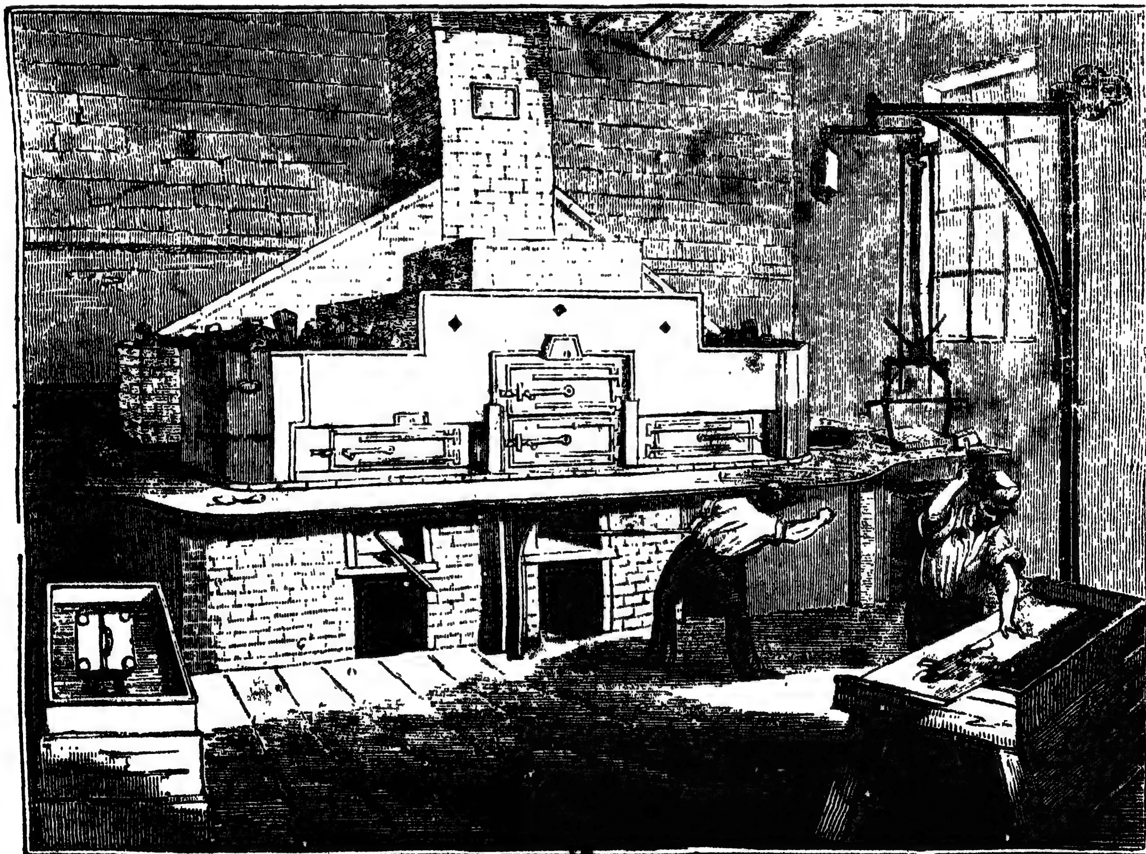
This supplementary number will be out of the compositors' hands, that is, it will be completely read and corrected, on Tuesday evening, the 19th of November. This is two or three days later than the ordinary time, a clear fortnight being usually allowed for working off the first impression of 160,000. The operation of casting will delay the working off for more than twenty-four hours; that is, if the moveable types were used, the machine would be working off the impressions from them on Wednesday morning, whereas the stereotype plates will not begin to be wrought off till the middle of Thursday. But the process of stereotyping has enabled us, during this time, to have ready *two* sets of plates from each page of moveable types. At the comparatively small expense of casting, we have saved the labour of having the text composed twice over, and the much greater labour and expense of having duplicate wood-cuts. If stereotyping had not existed, we must still have incurred this expense; because, by working off *two* Penny Magazines upon a *double* sheet, instead of *one* Penny Magazine upon a *single* sheet, we obtain our number of copies by 80,000 revolutions of a cylinder instead of by 160,000. Here, therefore, is a great economy of labour produced by having a double set of stereotype plates. But excellence of workmanship is also ensured by this arrangement. If our wood-cuts were subjected to 160,000 inkings, and 160,000 pressures of a cylinder, they would be irreparably injured long before the last impression was worked off; and those customers who obtained only the latter impressions would find a blurred and blotted engraving instead of one that is sharp and distinct. But the economy does not cease here: we can take as many casts as we please from the moveable types. In fact we always take six sets of plates, to replace those which begin to wear, and to provide against accidents. With this Supplement we are somewhat late. We remedy the evil by working *four* sets of plates instead of *two*; employing two machines instead of one. With one set of plates we should require twenty days to produce 160,000 copies; with two sets of plates we require only ten days; and with four sets of plates we require only five days.

But there is another advantage which stereotyping gives us, in allowing us to multiply casts to any extent. We can assist foreign nations in the production of 'Penny Magazines;' and we can thus not only obtain the high moral advantage of giving a tone to the popular literature of other nations, which shall be favourable to peace, and a right understanding of our common interests, but we can improve our own 'Penny Magazine' out of the profit which accrues from the sale of these casts. The American Government has a tariff, or duty, of 33 per cent. upon all foreign books imported into the United States. This tariff would prevent the 'Penny Magazine' being sold at two cents (nearly a penny), and would probably advance it to three cents. We send our pages stereotyped to a bookseller at New York, who employs American labour and American paper in working them off. By thus avoiding the tariff he can sell the 'Penny Magazine' at two cents. Further, the art of wood-cutting is imperfectly understood in France and Germany. We sell, therefore, to France and Germany casts of our wood-cuts, at a tenth of what it would cost them to have them re-engraved. These countries are thus enabled to produce their '*Magasin Pittoresque*,' and their 'Pfennig-Magazin.' This literary intercourse may appear to some people to be of trifling importance; but that circumstance cannot be uninteresting which has a tendency to direct the popular reading of four great countries into the same channels; and which, by lessening the cost of producing cheap books in each of the countries, leaves some capital free in each to be devoted to other intellectual objects. These circumstances are strikingly contrasted with the literary intercourse of France and England more than a century and a half ago. Le Jay, an eminent French advocate, in 1645, published a polyglott bible in ten volumes. He refused to supply England with copies at a moderate price; and Dr. Walton's polyglott was consequently undertaken here. That work was published in six volumes, in 1657; and Le Jay was obliged to sell those copies of his book for waste-paper which he might have disposed of in England. The production of two books of the same nature in both countries caused so much capital to be wasted in each as went to the production of the second book, and the destruction of part of the first. If that wasted capital had been saved, it would have remained for the encouragement of other literary enterprises, by which both countries might have been gainers. This consideration shows the fallacy of the argument that the large sale of cheap books hinders the sale of books which cannot be produced at so low a price. The cheaper a book can be produced, the more capital remains with the consumers of the cheap books to encourage other literary productions.

And this brings us to the great and paramount advantage of the stereotype process, namely, the economy of capital. The inherent difficulty of the business of a publisher consists in the mistakes he may make in calculating the demand for a particular book. The demand for broad-cloth, or bacon, or any other article of physical necessity, does not greatly vary. The demand for books depends, in a certain degree, upon fashion, and the prevailing current of public opinion. In books of a merely temporary interest, or which are addressed only to particular classes, and deal with particular modes of thought, a publisher often loses very considerably by over-printing. In this case the copies which remain locked

up in his warehouse for years, and are at last sold for waste-paper, absorb so much capital that might have been applied to other literary purposes if the demand for them had not ceased. But in books of universal interest, which address themselves to all classes, and which consequently may be sold cheap in the expectation of a large sale, the risk of over-production is very much diminished. But the publisher must still watch the demand. He must not run too much before it with his supply, for he may be ruined by his stock;—he must not lag too much behind it with his supply, for he may thus lose the market. Before the first Number of the 'Penny Magazine' was issued, it was impossible to say whether the periodical demand for the work would be 20,000 or 100,000 copies. Stereotyping came to the solution of the difficulty. It enabled the publisher then, and it enables him now, to adjust the supply exactly to the demand. One hundred and six Numbers have been published, and yet the supply of any one has not fallen behind the demand a single day. Twenty million 'Penny Magazines' have been issued from the commencement; and yet the publisher has rarely more than 2 or 300,000 in his warehouse. A small quantity of each number can be worked off from the stereotype plates at a day's notice; and a little foresight, therefore, can always ensure that the market shall be supplied, while the stock is kept low. This is the great secret of all commercial success. It is a secret which enables those who possess it to make a fortune with 5 per cent. profit, while those who do not understand it are ruined with 25 per cent. profit. It is the leading principle of the philosophy of shopkeeping; a subject upon which we may one day or other speak more at length.

The capital which is thus saved by the process of stereotyping, involving as it does all the savings of interest, of insurance, of warehouse-room, and all those other manifold charges which attach to a large stock, of necessity goes to the encouragement of other literary enterprises, and of the various labour which they involve. As long ago as the year 1725, William Ged, an inhabitant of Edinburgh, discovered the principle of casting metal plates. He carried the principle into commercial operation, for he was actually engaged by the University of Cambridge to print bibles and prayer-books. The compositors thought that the invention would injure their trade; and both they and the pressmen did every thing in their power to lessen the credit of Ged's books, by secretly making errors in the moveable types after the pages had passed the reader. The bibles, therefore, were so defective, that the University was obliged to give up the scheme. The art was revived, fifty years afterwards, by Mr. Tilloch, was subsequently prosecuted by Didot of Paris, and was ultimately brought to pretty nearly its present perfection by the late Lord Stanhope. If its progress had not been interrupted for three-quarters of a century by the ignorance of Ged's workmen, it is probable that during all that time the cost of producing bibles and prayer-books, and other standard works, would have been materially diminished; and the capital thus saved would have remained to have set the compositors and the pressmen to work in other directions. For the encouragement of all labour there must be a previous accumulation of the results of labour, which becomes a real labour-fund for the payment of wages. Every saving of previous labour renders this fund more productive for the encouragement of future labour. In the case of stereotyping for books of large numbers, not only is labour prevented from being wasted, but the equal evil of converting active capital into dead and unproductive stock is at the same time prevented. Whatever diminishes the risk of the capitalist ensures a more constant demand for labour, and therefore increases the rate of wages.



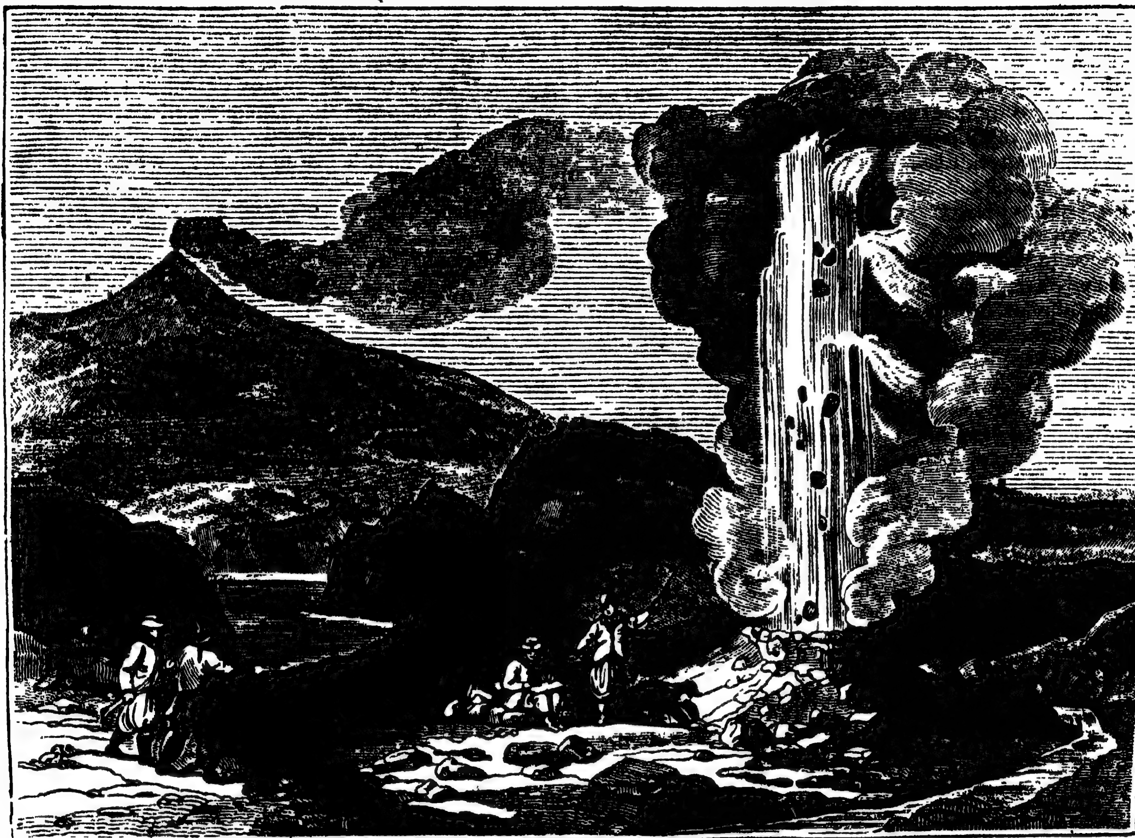
[Stereotype Foundry.]

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's Inn Fields.
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THE PENNY MAGAZINE
OF THE
Society for the Diffusion of Useful Knowledge.

108.] PUBLISHED EVERY SATURDAY. [December 7, 1833.

THE GEYSERS, OR HOT FOUNTAINS OF ICELAND.



[View of a Geyser, or Hot Fountain.]

In the neighbourhood of the volcanic mountains of Iceland, the traveller frequently finds his way stopped by frightful rents in the earth, and deep fissures in the lava. He also treads on ground that sounds hollow beneath his feet; and there he sometimes hears the rushing of water in the concealed chasms over which he is walking; and at other times, where apertures occur in the thin crust of the earth, he sees steam issuing forth from the subterranean conduits and towering in the air.

The volcanic fires which pour forth such tremendous eruptions from Mount Hecla, the Yokuls, and other craters, though, generally speaking, they do not exert their more terrific energies except after intervals of years, are yet not extinct, but, burning unseen, extend far from the craters themselves, and convert the waters that flow near them into boiling fluid and highly rarefied vapour, which at certain vents maintain perennial eruptions. Instead of fire, smoke, liquid lava, lapille, and ashes, these vents or aqueous craters discharge columns of steam and spouts of boiling water; and instead of years, in most cases, only a few hours intervene between their efforts.

The most important of these issues are at Haukadal, considerably in the rear of Hecla, whose three snow-clad summits towering over a ridge of intervening hills, are, however, visible from the spot. Here, within a very limited space, are some dozens of geysers, the clouds of vapour they are constantly emitting being visible at the distance of several miles. The term geyser, which is the generic name of these hot spouting springs, is derived from the Icelandic verb "geysa,"—"to rage, to burst forth violently." The most important of the fountains at Haukadal is called the "great geyser," and as it seems to be the greatest in Iceland, we shall more particularly describe it.

Whatever may be the activity of the numerous fountains that surround it, the great geyser is always the prominent object in the extraordinary scene. It is surrounded by a large circular mound formed by the earth and matter it has ejected and deposited during the course of ages. Internally this mound is hollow, presenting a basin about one hundred and fifty feet in circumference, which is ordinarily filled to the depth of about four feet with boiling water, beautifully clear and crystalline. In the middle of this basin a pipe or funnel, about ten feet in diameter, but wider at top, descends perpendicularly in the earth to the depth of nearly eighty feet. It is this tube that is the vent of the subterranean action of fire and water. The bottom and sides of the basin within the mound are covered with whitish siliceous incrustations rendered perfectly smooth by the constant action of boiling water. Two small channels open from the sides of the basin and allow almost constant passage to some of the water. This water, still hot and strongly impregnated with mineral matter, on leaving the mound flows through a turfy kind of soil, and by acting on the peat, mosses, and grass, gradually produces some of the most beautiful specimens of petrifaction. Leaves

of the birch, and of the other stunted trees which grow in that inhospitable climate, are also found incrusted, so as to appear as of white stone, yet still preserving not merely their general form but their minutest fibres unaltered.

All the Icelandic travellers agree in representing the eruptions of the great geyser as occurring at irregular intervals. We take our account of an eruption from Dr. E. Henderson *, who visited and paid great attention to the fountain in 1814 and 1815. Low reports and slight concussions of the ground give the first signal of coming violence. These symptoms are succeeded by a few jets thrown up by the pipe or funnel in the centre of the basin, and then, after a pause of a greater or less number of minutes, a rumbling noise is heard underground, louder reports succeed, and concussions strong enough to shake the whole mound; in the interior of which the water boils with increased violence, and overflows the edges of the capacious basin. Other reports soon follow, being louder and more rapid than the preceding, and not unlike the discharge of a park of artillery. Then, with an astounding roar and immense velocity, the water rushes through the pipe, and rises into the air in irregular jets, which are surrounded and almost concealed by accompanying volumes of steam. To these first jets loftier and more defined ones succeed, and there is generally a central or main jet presenting a column of boiling water from nine to twelve feet in diameter, and from fifty to seventy feet in height, on an average. Sometimes the main jet exceeds a hundred feet in height, and other geysers are said to throw water, though not in such volume, to a greater elevation. As the jets of the great geyser issue from the central pipe, the water in the basin near to the pipe is raised about a foot and a half, and as the columns descend into the orifice whence they were ejected the water everywhere overflows. Unlike the eruptions of fire from the crater of a volcano, which often last for days without any apparent diminution or pause, these boiling fountains seldom play longer than six or seven minutes at a time. Then the action of the central pipe ceases; dense steam covers for awhile the basin; and when that moves off, nothing is seen but a sheet of clear, hot water, and all is quiet, until, after an interval of some hours, faint reports announce the approach of a fresh eruption. On Dr. Henderson's second visit to the great geyser, in August, 1815, when he pitched his tent close to it for two days, its eruptions occurred pretty regularly every six hours, and some of the columns of water rose to the height of one hundred and fifty feet.

Situated at about one hundred and fifty yards to the south of the great geyser, and scarcely inferior to it, is the new geyser, whose eruption Dr. Henderson thus describes:—

"From an orifice nine feet in diameter, a column of water, accompanied with prodigious volumes of smoke, was erupted with inconceivable force, and a tremendous roaring noise, to varied heights of from fifty to eighty feet, and threatened to darken the horizon, though brightly illumined by the morning sun. * * * * When the jets of water subsided, their place was occupied by the spray and steam, which, having free room to play, rushed with a deafening roar to a height little inferior to that of the water. On throwing the largest stones we could find into the pipe, they were instantly propelled to an amazing height, and some of them that were cast up more perpendicularly than the others remained for the space of four or five minutes within the influence of the steam. A gentle northern breeze carried part of the spray at the top of the pillar to one side, when it fell like drizzling rain, and was so cold that we could stand below it and receive it on our hands and face without the least inconvenience. While I kept my station on the same side with the sun, a most brilliant circular bow, of a large size, appeared on the opposite side of the fountain; and, on changing sides, having the fountain between me and the sun, I discovered another, if possible still more beautiful, but so small as only to encircle my head. Their hues entirely resembled those of the common rainbow."

* 'Iceland, or Journal of a Residence in that Island, during the Years 1814 and 1815,' by Dr. E. Henderson.

Still nearer to the great geyser, at the distance of only eighty yards from it, there was formerly another fountain, called the roaring geyser, from the continual noise it made. Its jets rivalled in height those of the great geyser, but in consequence of an earthquake, in 1789, its volume of water was greatly diminished, and in the course of a few years this fountain entirely ceased. At the same time, however, another geyser, which had been insignificant before, began to throw up water and steam to a great height.

Earthquakes, by intercepting the subterranean currents of waters, or by opening new channels and giving other directions to those waters, by disrupting the crust of the earth here, or by filling up former crevices there, and by other processes not so easily detected, exercise an immediate and great influence over these fountains. During the dreadful earthquake that shook the island to its very centre, in 1784, not only did the greater geysers shoot up with increased violence, but no fewer than thirty-five new boiling fountains made their appearance close to them. Many of these thirty-five have since wholly subsided.

The most remarkable of the geysers still in activity, next to those already described, are the strockr, the little geyser, and the little strockr. The name of strockr is derived from the Icelandic verb "strocka,"—to agitate, to put in violent motion. Dr. Henderson informs us he discovered what he calls the key to this fountain, by which he thought he could make it play whenever he had a mind, and even double its usual height. He threw in a quantity of the largest stones he could collect—presently it began to roar—he advanced his head to look down the pipe or funnel, but had scarcely time to withdraw it, when up shot the jets of boiling water carrying the stones with them, and attaining a height which he calculated at two hundred feet. Jets surpassed jets until the water in the subterranean cavern being spent, only columns of steam were emitted, and these continued to rise and to roar for nearly an hour. The next day he repeated the experiment with the like success; and leaving the spot to go on his journey, he says, he often looked back on the thundering column of steam, and reflected with amazement at his having given such an impulse to a body which no power on earth could control.

The little geyser is remarkable for the regularity of its discharges, playing about twelve times in twenty-four hours. Its jets, however, seldom exceed twenty feet in height.

The little strockr is still more curious, from the rapidity as well as regularity of its action, and from the eccentricity of its projection. Instead of having intervals of hours like the generality of the geysers, it plays every quarter of an hour, and instead of throwing up its waters perpendicularly, it darts them off in numerous diagonal columns. Dr. Henderson calls it "a wonderfully amusing little fountain."

Numerous other minor orifices and cavities lie round these; some of them boiling and bubbling, and being covered with the most beautiful incrustations.

From the quantity of vapour emitted from these numerous vents, it often happens that the steam unites, and forming a vast cloud, ascends, rolls, and spreads itself, till it completely covers the confined horizon and eclipses the mid-day sun. The effect produced by the reports and loud roaring of these fountains, during the stillness of night, is described as being peculiarly im-

pressive. On the brow of the neighbouring hill, nearly two hundred feet above the level of the great geyser, there are several holes of boiling clay, some of which produce sulphur and efflorescence of alum. On the reverse of the same hill, and at its base, are more than twenty other hot springs.

Among the other boiling fountains in different parts of the island, travellers have particularly described those in a narrow valley near Reykium. There, some of the springs, which do not erupt but regularly contain water at the temperature of 200° of Fahrenheit, are used by the Icelanders for boiling, for washing their clothes, and other domestic purposes. Beyond these occur extensive banks of hot sulphur and hot clay. At the immediate edge of the valley are two large geysers frequently in eruption. They are situated at the base of a beetling mountain, whose rugged crags rise about five hundred feet above the springs. It has been calculated that, during an eruption, one of these two geysers throws up 59,064 gallons of water every minute.

Not far from this spot, numerous hot springs exist in the bed of a considerable river, and the quantity of boiling water they emit is so great that it cannot be kept under by the cold water of the river, but forcing its way upwards, it bubbles and spouts above the surface of the stream.

THE LABOURERS OF EUROPE.—No. 7.

The state of the agriculture of France, and the condition of its labourers, have not improved so much during the last forty years as one might at first have expected, from the abolition of feudal dues and of tithes, and from the general subdivision of property that has taken place. Several causes may be assigned for the still depressed state of the farmers in that country. Want of enterprise, want of capital, bad methods of cultivation which it takes several generations to correct, a deficiency of communication in many parts between one province or district and another, a heavy land-tax, restrictions on the foreign commerce of the country, and the prevalence of the métayer system, of which we have spoken in a former article *. The manner in which all these circumstances act as checks upon the agricultural prosperity of France will be exemplified in the course of the following quotations from intelligent observers who have visited that country at various times since the revolution.

We find already, in the year 3 of the Republic (1795), complaints of the state of agriculture, in a work on the 'Political and Economical State of France,' published at Strasburg, in German. The writer observes that "enlightened foreigners are astonished at the depressed condition in which they find agriculture in France; that every year an immense extent of territory is suffered to lie fallow, although good agriculturists condemn fallows. There is not in France any scientific school for the mass of the cultivators; many breeds of cattle, many seeds and plants, instruments and machinery, and above all good methods, all these still remain to be introduced from abroad: some departments, it is true, are much better cultivated than others, but the improved system which is practised in one district is unknown to the rest."

We will now see what was the state of French agriculture ten or twelve years later, when the country was thoroughly at peace internally, and order and security were maintained under the administration of Napoleon. We have an impartial witness in Colonel Pinkney, an intelligent American traveller, in the years 1807-8. He entered France by the way of Calais, and travelled on horseback and at leisure through the country, often resting at farmers' houses, and losing no opportunity of deriving information from the country people themselves. In the neighbourhood of Calais he observed that the peasantry lived comfortably; but he suspected, at the same time, that their means were partly supplied by the profits of smuggling, which was carried on very extensively on that coast. As he advanced into the country, he remarked "the slovenly management of the French farmers as compared with those of England, and even with those of America. In some of the hay-fields which I passed, at least one-fifth of the crop was scattered on the roads and in the fields. The excuse was, that the cattle would eat it, and that they might as well have it one way as another. And yet in these very fields the labour was so plentiful and minute, that the greater part of the crop was carried from the fields on the shoulders of the labourers,—men, women, and boys. In such of the fields as I saw carts, the most severe labour seemed to be allotted to the share of the women. They were the pitchers, and performed this labour with a very heavy, and, as it appeared to me, a very awkward fork. Whilst the women were performing this task, two or three fellows, raw-boned, and nearly six feet high, were either very leisurely raking, or perhaps lying at their full length under the new-made stacks."

As Mr. Pinkney approached Clermont he found the country improving in its scenery, orchards, vineyards, and corn-fields. He inquired the rent and purchase of some of the farms that were to be let or sold, and found them so cheap, that, "could he have reconciled himself to French manners, and promised himself any suitable assistance from French labourers, he would have seriously thought of making a purchase. The main point of such purchases, however, is contained in these words:—'Under proper cultivation.'"

After staying some time at Paris, where he saw Napoleon, Mr. Pinkney set off for the western provinces in company with Mr. Younge, secretary to the American Ambassador. Unlike the country between Calais and Paris, and that between Paris and Switzerland, which are mostly without enclosures except pales and ditches, the country to the westward of the capital, on the road to Chartres, is thickly enclosed with rough and open hedges, but with few gates and no stiles. Mr. Younge, who had traversed France in all directions, told Mr. Pinkney that, with the exception of the good enclosures, nothing could be so miserable as the system of agriculture along the whole road from Paris to Mans, nearly one hundred miles south-west of Paris. "The general quality of the soil is light and sandy, and exactly suited to the English system of alternate corn and roots; yet on such a soil the common course is no other than fallow, wheat, and barley, for nine years successively, after which the land is pared and burnt, and then suffered to be a fallow in weeds for another year, when the same course is recommenced. Under such management it is not surprising that the average produce of the province of Britany should not exceed twelve bushels of wheat, and eighteen of barley. Turnips they have no idea of, and as the proportion of cattle is very small, the land is necessarily still further impoverished for want of manure. The size of the farms is generally about 80 acres English; they are usually held from year to year, but there are some leases."

Under the head of Angers, Mr. Pinkney observes that there is scarcely a good house inhabited within the walls. The provincial towns in France differ in this respect from those in England, in which you generally find a number of good houses, where retired merchants and tradesmen live in the ease and style of private gentlemen. There is little or nothing of this kind in a French country town. Every house is a shop, a warehouse, or a lodging-house. "In England, and even in America, there are few tradesmen long resident in a town without having obtained a sufficiency to retire; whilst the French towns being comparatively poor, and their trade insignificant, the French

* See 'Labourers of Europe, No. 6,' in No. 81 of the 'Penny Magazine,' July 6, 1833.

tradesman can seldom do more than obtain a scanty subsistence by his business. In all the best French towns the tradesmen have more the air of chandlers than of great dealers. In some of their principal manufacturing places there may be indeed a few principal men and respectable houses, but neither these men nor their houses are of such number and quality as to give any dignity or beauty to their towns beyond mere places of trade. The French accordingly, judging from what they see at home, have a very contemptible idea of the word merchant; and if a foreign traveller of this class should wish to be admitted into good company, let him pass by any other name than that of a *marchand* or *négociant*. This class of foreigners are specifically excluded from admission at court." This was in the time of Napoleon. We must add that the French word *marchand* does not correspond to the English "merchant," but means a retailer, a shopkeeper; whilst the word *négociant* means a wholesale dealer, a man who has a counting-house, who negotiates bills of exchange, &c. The above remarks of Mr. Pinkney hold good in most parts of the continent besides France, and especially in Italy and Spain.

The banks of the Loire from Angers to Tours and Blois, and higher up the river to Orléans and Nevers, and thence to Moulins, constitute the finest and most fertile part of France. The condition of the peasantry is comfortable; they are temperate, good-humoured, and sufficiently clad; their wants are few; and their labour, added to the fertility of the soil, is sufficient to satisfy them. They repine not for luxuries of which they have no notion. The women, however, have more than their due share of the labour,—they reap, bind, and load. They soon lose therefore every appearance of youth in the face; they look old and wrinkled; and the old peasant women in France are absolutely frightful.

There are no parochial taxes in France for the relief of the poor as in England, but distress seldom occurs without being relieved. An inhabitant of the northern countries and cold climates can scarcely form an idea what a very different kind of sustenance is required in southern ones. Chestnuts, grapes, and onions are, to the French peasant, what potatoes are to the Irish. "The breakfast of a French labourer usually consists of bread and fruit; his dinner of bread and an onion; his supper of bread, milk, and chestnuts. Sometimes a pound of meat will be boiled with the onion, and a *bouilli* is thus made, which, with management, will go through the week. The climate is such as to require no expense in fuel and very little in clothes."—*Pinkney*, p. 299.

There are no game-laws in France, but there is a decency and moderation in the peasants which answers the same purpose. No one attempts to shoot game except on land of which he is the proprietor or tenant.

The farms in the central provinces of France are very small, and the farmers are consequently poor. They have neither the spirit nor the means of improvement. They are, in fact, but a richer kind of peasantry. There are few or no leases in these provinces, and this is one of the reasons why agriculture has remained where it now is for these four or five last centuries. In large estates, one-fourth is generally forest and another fourth waste. In England, the forest and waste would be brought into cultivation; but in France, the forest is little better than a waste, and the waste is turned to as little purpose as if it were the wild sea-beach.

MINERAL KINGDOM.—Section 18.

COAL.

Coal-Fields.—Having presented our readers with a sketch of the natural history of coal, including its composition, geological situation, and probable origin, we shall now proceed to describe its geographical position in the United Kingdom. We shall begin with England, giving a general view of all the coal-fields; and we shall then enter into a somewhat more detailed description of some of the most important of these.

Previously to the researches of the English geologists, within the last fifteen years, very vague notions prevailed as to the extent to which this valuable mineral was spread over England; and it was a belief by no means uncommon among persons unacquainted with such subjects, that there was no part of the country in which it might not be found. Endless were the trials, and countless the sums of money wasted in borings and sinkings of shafts, where there was as little chance of finding a workable coal as gold or diamonds. But since the publication of the geological maps of Mr. Greenough and Mr. Smith, every one who chooses to inquire may know where our present coal-fields are situated, where there is a possibility that others may exist, and, what is of no less importance, where the mineral structure of the ground is of such a nature as to make it certain that searches after coal in such situations can only end in disappointment and loss. It is hardly necessary to add, that it is a vulgar error to suppose that coals grow, and that they will be replaced in the situations from which they have been once extracted. The annexed outline map gives a general view of all the coal-fields of England: and it will be seen that fully one half of the country is destitute of coal; for all that lies east and south of the double line, Z Z, from the mouth of the Tees in Yorkshire, to Lyme Regis in Dorsetshire, is composed of the superior secondary strata; and although some of these do sometimes contain thin beds of coal of a particular kind, it may be confidently said, that the kind of coal which we usually consume will never be found in those upper secondary strata; and, unless under very favourable circumstances, the inferior kind above alluded to can never be worked with profit. It will also be seen how comparatively small a space the coal measures occupy. It is necessary to remind our readers, that the spaces here marked with dark lines are the *geological* boundaries of the coal formations, which, as we have already explained in previous sections, consist of many different kinds of stone besides coal; and that it must not be supposed that workable coal is spread over the whole space marked by the darker shade. Not only is that far from being the case, but there is a very large part of all those spaces where not a trace of coal is to be seen, there being only sandstones, limestones, or shales, the other members of the coal formations.

Besides showing the positions of the different coal deposits, the map exhibits the boundaries of the country which each supplies with fuel. We are indebted for this information to the evidence given by Frederick Page, Esq., before the Committee of the House of Commons on the Coal Trade in 1830. Mr. Page stated, that in the course of several years' travelling over England, he had collected so much information as to the distribution of coals by the different inland navigations, as to be able to construct a map on which the boundaries were laid down: he gave a copy of that map to the Committee, who published it along with their Report. In the annexed map, it is to be understood that all the space included within the line which surrounds a coal deposit, is supplied from that source. the larger districts are further distinguished by a small letter corresponding with the capital letter which marks the coal-field. These boundaries are of course not rigorously correct, but they are sufficiently so to give a tolerably accurate general view how far the market of each coal-field extends, independent of foreign export, and the supplies to Scotland from the Northumberland district, and to Ireland from the western coal-fields. The extent which the consumption of a coal-field reaches, depends upon a variety of circumstances, such as the

acility of transport by sea or by canals, the quality of he coal, and its price at the pit's mouth ; this last must e in a great degree regulated by the expense of bringng it to the surface, which is very variable, according o situations.

There are in England and Wales twelve great coalields, of which those marked I. II. IV. VI. XII. are the nost important. These are,

I. The Northumberland and Durham Fields, the almost exclusive feeders of London, and supplying, besides, the whole of the eastern and southern coasts from Berwick to Plymouth, and as far inland as the county of Bedford. Formerly the inland markets extended further; but the extension of canals has brought other and cheaper coals into competition. There is also a very large foreign export, and a considerable quantity is sent to Scotland.

II. The Yorkshire, Nottinghamshire, and Derbyshire Fields.

A Map showing the Geological Position and Commercial Distribution of the Coal of England and Wales.



1 Newcastle.
2 North Shields.
3 South Shields.
4 Sunderland.
5 Durham.
6 Cockermouth.
7 Whitehaven.
8 Lancaster.
9 Liverpool.
10 Manchester.
11 Scarborough.
12 Derby.
13 Nottingham.
14 Leicester.
15 Northampton.
16 Shrewsbury.
17 Birmingham.
18 Oxford.
19 Gloucester
20 Windsor
21 Bristol.
22 Bath.
23 Colchester.
24 Bedford.
25 Cambridge.
26 Dover.
27 Canterbury.
28 Maidstone.
29 Hastings.
30 Brighton.
31 Portsmouth.
32 Exeter.
33 Plymouth.
34 Falmouth.
35 Caernarvon.
36 Cardigan.
37 Caermarthen.

The dark shade of tint shows the extent of the Coal Fields.

The lighter shade represents the districts of the country supplied by them.

The lines which express the tints are in both cases parallel to each other, and in each of the twelve districts have a different direction, except the Newcastle and Durham, in which, for the sake of clearness, the coal fields (I.) have been left black, and the places supplied by them white. Each district is surrounded by a strong black outline.

III. The Whitehaven Fields.
IV. The South Lancashire Fields.
This, with the Yorkshire and Nottinghamshire Fields, are the foundation of our great national superiority in the woollen and cotton manufactures, the principal seats of which are upon them.
V. The North Staffordshire, or Pottery Fields.
VI. The South Staffordshire, or Dudley and Warwickshire Fields,—not of great superficial extent, but immensely productive, and containing the thickest seam of coal in the island. It is also one great seat of our iron manufactures
VII. The Shropshire Fields, including Coal Brook Dale, and the Plain of Shrewsbury.
VIII. Forest of Dean Field.
IX. South Gloucestershire, or Bristol Fields.
X. Somersetshire Field.
XI. North Wales, or Flintshire Fields.
XII. The South Wales Fields, comparatively little worked as yet, but the most extensive of all, and upon which our posterity must depend, when the other fields are exhausted.

Thus it will be seen that all the coal-fields, and all the great seats of our manufactures, lie to the north and west of the line Z Z, which is the boundary of the middle and superior strata of the secondary series; for, with the exception of some detached points in Somersetshire and Glamorganshire on the Bristol Channel, neither the lias limestone, nor any of the formations superior to it (I. in the diagram in No. 51.—19th January,) are found westward of that line. The New Red Sandstone, K, which is immediately under the lias, and covers so vast a surface in the midland and northern counties, lies all to the north and west of the line; many of the coal-fields are surrounded by it, and it is possible that others may be discovered within its domain, either where it is partially denuded, or where it is so thin that it may be sunk through without great expense. At searches for coal in the Red Sandstone itself would, according to every probability, end in disappointment.

Having now given a general view of the coal-fields of England, we shall, in our next section, lay before our readers a more detailed sketch of the great deposit of Northumberland and Durham.

DIFFERENCE BETWEEN TRADING, GAMBLING, AND ROBBING.

All exchanges must be of things either of the same kind, or of different kinds. Now as all persons who make an exchange expect to profit by it, to exchange an ingot of gold against an ingot of gold, or a pound of bread against a pound of bread, would be a mere waste of trouble; although neither party would lose, yet neither would gain anything by the transaction. In order, therefore, to induce people to exchange things of the same kind, it is necessary that there should be some means of enabling both parties to expect or hope for a profit. Now, in gambling, which consists in exchanging money for money, this is effected by the introduction of the element of chance. When two people agree to stake a shilling a-piece on the cast of a die, as one *must* win, *both* may hope to win, which would not be the case if they merely *changed* shillings. Consequently if we were to exclude from gambling the element of chance, which can only be done by multiplying the stakes, it would be reduced to a mere waste of labour, attended with neither pecuniary loss nor gain. A man who passed twelve hours a day for fifty years in tossing up for sovereigns would probably be able to rise many hundred times during that period neither a gainer nor a loser. And for this reason, in all lotteries and gaming establishments there is a small advantage allowed to the undertaker of the table, which, in the long run, reduces the gain to a certainty; whereas, if there was no such advantage, and if there was no fraud practised on the players, a lottery or a gambling bank could never yield any profit, as its transactions would consist in merely exchanging money for money. When, however, gambling is not practised on a sufficiently large scale to reduce its operations to a certainty, and consequently to exclude the possibility either of loss or gain, (which must be the case with all unprofessional gamblers,) it is not merely a waste of time, but is always a losing speculation; because, although the chance of gain is equal to the chance of loss, yet the advantage of gain does not counterbalance the disadvantage of loss. A man whose entire fortune is £1000 would not be so much benefited by doubling it, as he would be injured by losing it. He would suffer more pain at being penniless than he would feel pleasure at being the owner of £2000: for this reason, if ten people sit down to play for a sum of importance to the parties, it is strictly true, though it may sound like a paradox, that as every man in succession takes the dice-box in his hand, the chances are against him: he stakes a chance of loss, of which the pain may, for the sake of illustration, be valued in numbers at one hundred against a chance of gain, the pleasure of which may, numerically reckoned, be not greater than twenty or thirty. It is on this principle that the expediency of the right of property is founded, the advantage of the thief being far less than the disadvantage of the legal owner.

It appears, therefore, that in order to induce people to exchange things of the same kind, it is necessary that each party should have a prospect of gain; and that although such a prospect exists in gambling, which is an exchange of this nature, and there is a chance of gain to each party, yet the probability is that each will be injured by the transaction. Consequently gambling, considered as a pecuniary transaction, is injurious in two ways,—for not only is the loss of one a necessary condition for the gain of the other, but the losing party suffers more pain than the gaining party feels pleasure; one party always loses, and the other does not gain to the full amount of his loss. In exchanges of things of different kinds, all this (as we remarked in a former Number*) is reversed. These are the exchanges which belong to commerce, and in these there is no loss on either side, but both parties are necessarily benefited by the transaction, if there is neither force nor fraud nor mistake. A man may, by the dread of the consequences of a refusal, be induced to give more in exchange for services or goods than he would do if he was free from fear, as sometimes happens with travellers in barbarous countries; but this is a mere case of extortion, and such exactions might as well, and indeed often do, assume the appearance of gifts. Again, a man may be cheated in an exchange, and may be deceived by the false representations of the vendor into a belief that what he is purchasing is a valuable commodity, whereas it is only made, like the razor in the story—to sell. In such cases as this, however, the buyer is only a loser by the exchange, because the article turns out to be something different from what he expected. A purchaser may likewise be mistaken as to his own wants, or the state of the market which he supplies: for instance, he may send for a physician, believing that he is sick, though, in fact, he is in perfect health; or he may buy a pair of spectacles, and the next day completely regain or completely lose his eyesight; he may buy gunpowder and muskets in expectation of a war, and no war may break out; or corn in expectation of a bad harvest, and an abundant one may follow; or send a cargo of skates to a country where water never freezes. There are certainly many cases in which a man, acting on false or imperfect information, or from a wrong judgment, finds to his cost that he has made a losing bargain: but property may

* See Penny Magazine, No. 36, vol. i. p. 293.

equally be depreciated which has not been the subject of barter; nor does a speculator lose because he has made a certain exchange, but because he possesses certain commodities. The farmer loses with the corn-merchant by a fall in the prices of grain, and an innkeeper on a road on which the travelling is suddenly stopped by a war is equally injured whether he has acquired his property by inheritance or by purchase.

With the exception, therefore, of the three cases just mentioned, viz., extortion, fraud, and mistake, all exchanges of things not of the same kind are necessarily advantageous to both parties. The profit of the one party is quite independent of the profit of the other; nor do their gains stand to each other in any fixed ratio. They may both be large or both be small, or one large and the other small. Thus Herodotus mentions some Greek merchants who made an immense profit by trading with the barbarous inhabitants of Iberia, or Spain, and giving them goods in exchange for silver. However profitable this adventure may have been to the Greeks, probably the Iberians were equally well satisfied with their bargain, as they doubtless prized far more highly than their precious metal the manufactured articles which they got in exchange for it. The gain of one party affords no means of ascertaining the gain of the other: the profits of an exchange are not like the buckets of a well, in which one rises in precisely the same measure as the other falls, but they depend on the difference between the value of the goods sold and the goods bought, in the market from which the former are taken, and to which the latter are carried.

If this plain truth had been sufficiently understood, all the national jealousies with regard to trade, which have been the cause of so many wars, so many commercial restrictions, and so much suffering to mankind, might have been avoided. All these jealousies have been founded on the notion that in trade one man's gain is another's loss, and consequently that one nation's gain is another's loss. It was with this false impression, strengthened indeed by national hatred and the desire of weakening his enemies, that Bonaparte, in the preface to his Berlin Decree, represents England as raising her commerce and industry on the ruins of the industry of the Continent. So far is it from being true that the industry of one country is not compatible with the industry of another, that foreign productions are absolutely indispensable to the existence of commerce. If England had in truth succeeded in destroying the industry of the Continent, she would, at the same time, without the assistance of the Berlin Decree, have destroyed her commerce with the Continent; for nobody will sell goods to those who have nothing to give in exchange for them. It was under the influence of the same false opinions that Bonaparte (according to his own account) refused, after the peace of Amiens, to renew the commercial treaty between France and England, except on terms of reciprocity, viz., that if France received so many millions of English imports, England should be obliged to take in return the same quantity of French productions. (Sir Walter Scott's 'Life of Napoleon,' ch. 99.) Supposing that so absurd a treaty had been concluded between England and France, it would probably have been easy to evade its stipulations by false valuations, and other contrivances which nullify impolitic and oppressive laws; but the reciprocity which Bonaparte wished to enforce by treaty necessarily exists without a treaty. It would have been impossible for England to have sold to France goods to the value of a million, without receiving in payment from France, either directly or circuitously, other goods to the value of a million.

All regulations of this kind intended to ensure an equality or a community of advantage in commercial dealings, have been founded on the belief that loss or gain imply one another. This opinion, manifestly false as it now appears to us, was no long time ago received as an undeniable axiom among persons who had not devoted a particular attention to the subject of trade. "As to mere wealth, that is to say money, (said Dr. Johnson, speaking of Smith's 'Wealth of Nations,') it is clear that one nation or one individual cannot increase its store but by making another poorer." (Boswell's 'Life of Johnson,' vol. iii., p. 148.) Misled by a false analogy, they conceived, that because in gambling, thieving, and war, one person can only gain at another's expense, therefore this is also the case in trade.

In war, indeed, it is emphatically true that one man's gain is another's loss; nor does conquest simply take the property from the owner, but what it does not waste, it places in the spoiler's hands with a value immensely depreciated. "At the first view it should seem that the wealth of Constantinople (says Gibbon, speaking of the first capture of that great city) was only transferred from one nation to another, and that the loss and sorrow of the Greeks are exactly balanced by the joy and advantage of the Latins. But in the miserable account of war, the gain is never equivalent to the loss, the pleasure to the pain *." Nor does it often happen that the spoils of the victor are sufficient to repay the cost of victory; and the lot of mankind would have been far happier if all governments had felt the truth of the remark which Sir Walter Scott, in one of his novels, puts in the mouth of the regent Murray, that "war is the only game from which both parties rise losers."

But in trade, so far from one party always losing, and the other party never gaining to the extent of the other's loss, both parties always gain, and the profit of the one does not diminish the profit of the other. While in all plunder and rapine, whether between nations or individuals, the benefit is necessarily partial, and can only be purchased by a disproportionate expenditure of suffering and misery: the benefits of commerce are general, require no corresponding sacrifice, and are free from any alloy of evil.

SAINT PETER'S.—No. 3.—(*Concluded.*)

The Basilica, or cathedral of St. Peter's, does not stand within the limits of the ancient city of Rome, nor is it indeed on the same side of the Tiber as the most renowned parts of that city. It rises on the side of the Vatican Hill, which may be considered as an extension of the Janiculum, the only one of the seven hills on the right or north bank of the river, the other six being all on the left bank.

"In the most high and palmy state of Rome," it was on the Vatican that the triumphs of conquerors were prepared, and the processions marshalled; at a later period, under the empire, the hill was adorned with temples, palaces, and places of public amusement; and here stood the circus of Caligula or of Nero, in which many of the early Christians are said to have been killed in those barbarous combats and games which disgrace the Roman name. This circus was also said to be the scene of the crucifixion of the apostle Peter. It was Constantine the Great who first erected a Christian church on the blood-defiled spot, choosing for its site part of the ground that had been occupied by the circus, and the spaces where the temples of Mars and Apollo had stood. As architecture was then in a very degraded state, it may be concluded that the edifice of Constantine could boast no great beauty; its magnitude, however, was considerable, being three hundred feet long, and more than one hundred and fifty feet wide. After standing for nearly twelve centuries, it threatened ruin, and several popes endeavoured to avert this by

* 'Decline and Fall of the Roman Empire,' vol. vii., p. 197.

repairs and additions; but at length Julius II., a pontiff of great energy, determined, in 1503, to erect an entirely new temple, which should stand over and include the site of the most important part of the old one.

Bramante Lazzari was the architect he preferred, and whose plan was, to build the church in the form of a Greek cross. Shortly after Bramante's death the work fell to the great Michael Angelo Buonarotti, who gave the edifice the peculiarly sublime character it possesses, still following up the plan of Bramante inasmuch as related to the form of the Greek cross. "There are eighteen whole years of Michael Angelo's life in the church of St. Peter's," says Dupaty; but the great artist could not live to complete so vast a work, and the mantle of his genius fell on none of his successors. The original plan, moreover, was departed from,—the lengthy, unequal Latin cross was substituted for the Greek, because it was considered essential *that the new edifice should include the whole of the site of the ancient church of Constantine!* To this last circumstance are mainly attributable the defects in the building.

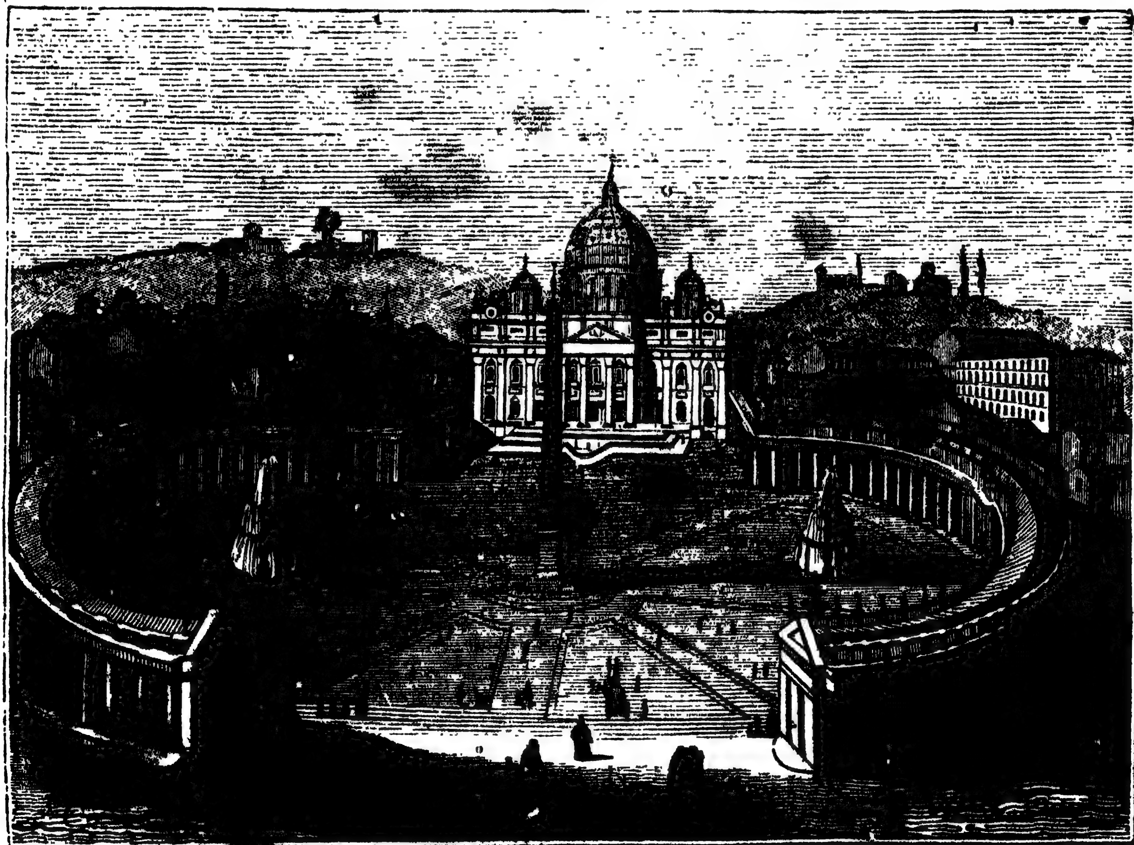
The first stone of the church was laid by Pope Julius II., in 1506, and the front was completed in 1622, during the pontificate of Paul V., the seventeenth successor of Julius. Although constantly advancing, with all the means that the wealth and extensive influence of the Roman hierarchy could then command, it took the reign of eighteen popes and the period of one hundred and fifteen years to see the temple *alone* finished. The splendid additions and accessaries occupied one hundred and fifty years more. Up to the year 1622 the buildings cost the Roman see forty millions of crowns (more than eight millions sterling); and between that date and 1784 nearly ten millions of crowns more were expended. At the present time it costs the papal treasury thirty thousand crowns annually to keep the immense edifice in repair.

As scarcely two books of travels agree in their accounts of the dimensions of St. Peter's, we are happy to be able to give the correct measurements, as recently made by an English architect.

The clear *inside* length of the church is six hundred and fifteen feet, and the breadth, in the transepts, four hundred and forty-eight feet. The extreme height, from the level of the piazza before the temple to the apex of the cross, is about four hundred and sixty-four feet, or nearly one-fourth as high again as our St. Paul's. The distance from the extreme line of the ellipsis of the colonnades to the portals of the church is nine hundred feet, which, added to the *outside* length of the church, including its thick walls and vestibules, gives the prodigious distance of nearly one-third of a mile, covered by St. Peter's and its accessaries.

The masonry of the church, its cupola, (which is externally covered with lead,) and its adjuncts, is of Travertine stone. Whole quarries must have been exhausted in the superstructure, or parts that meet the eye, yet a still vaster quantity of stone remains unseen, the depth of the foundations and the enormous thickness of the substructions being such that there is actually more of the material below than above the surface of the ground.

It must be remarked, that the general view which we now present to our readers has been composed from an imaginary point considerably above the tops of the houses opposite to St. Peter's; it is, in short, a bird's-eye view, intended to show, more clearly than any really practical view could, the arrangement of the various parts and objects composing the whole.



[Bird's-Eye View of St. Peter's.]

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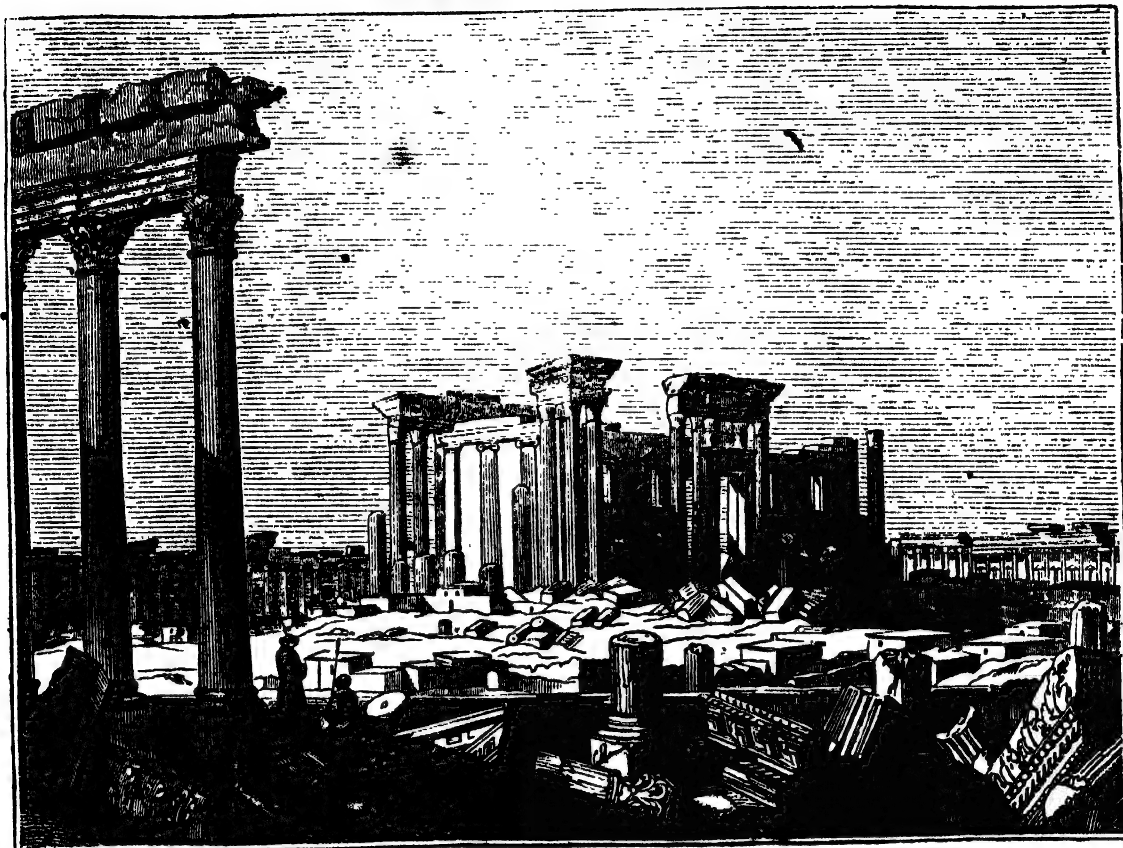
THE PENNY MAGAZINE

OF THE

Society for the Diffusion of Useful Knowledge.

109.] PUBLISHED EVERY SATURDAY. [December 14, 1833.

PALMYRA.—No. 2.—(*Concluded.*)



[Temple of the Sun at Palmyra.]

We learn the fact of the existence in ancient Palmyra of a Temple of the Sun, from the letter of the Emperor Aurelian already noticed; and from that also we may infer that this was the chief of all the public buildings of the city. The object of the letter is to direct the reparation, at great cost, of the injuries which this temple had sustained. No doubt can be entertained that the immense pile situated at the eastern extremity of the present ruins is what remains of the magnificent structure in question. Its superiority in extent and splendour point it out as having been by far the most remarkable building even in a place crowded as this was with monuments of the most superb architecture. Some of its still remaining decorations, among which a representation of the sun is conspicuous, confirm its title to the name that has been given to it. Perhaps its position, facing the east, may be admitted as an additional proof in favour of the common supposition. The circumstance of its standing near the wall of the city, too, may possibly account for the severe degree in which it suffered during the siege of Palmyra by Aurelian, as noticed in the letter of that emperor.

Wood's description of this Temple, though amply illustrated by drawings, is extremely meagre. The most accurate account of it which we have met with is that given in the article Civil Architecture in the 'Edinburgh Encyclopædia;' but it is too technical for any except professional readers. The following sketch of the general appearance and most striking features of the ruin is taken from Mr. Halifax's letter, published in the 'Philosophical Transactions,' to which we referred in our last account. To shorten the extract, we have omitted some things of minor interest.

"The whole inclosed space is a square of 220 yards each side, encompassed with a high and stately wall, built of large square stones, and adorned with pilasters within and without, to the number (as near as we could compute by what is standing of the wall, which is much the greater part) of sixty-two on a side. And had not the barbarity of the Turks, enemies to everything that is splendid and noble, out of a vain superstition purposely beat down those beautiful cornishes both here and in other places, we had seen the most curious and exquisite carvings in stone which perhaps the world could ever boast of; as here and there a small remainder, which has escaped their fury, does abundantly evidence. The west side wherein is the entrance is most of it broken down, and near the middle of the square another higher wall erected out of the ruins, which shows to have been a castle, strong but rude; the old stones and many pillars, broken or sawn asunder, being rolled into the fabric, and ill cemented. * * * Before the whole length of this new front, except a narrow passage which is left for an entrance, is cut a deep ditch, the ascent whereof on the inner side is faced with stone to the very foot of the wall, which must have rendered it very difficult to have assaulted it. The passage to and the door itself is very narrow, but wider than to receive a loaded camel, or that two footmen may well walk abreast. * * * But all this is but a new building upon an old, and by this outward wall is quite shrouded that magnificent

entrance, which belonged to the first fabric; of the stateliness whereof we were enabled to judge by the two stones which supported the sides of the great gate, each of which is thirty-five feet in length, and artificially carved with vines and clusters of grapes, exceeding bold and to the life. They are both standing and in their places, and the distance between them, which gives us the wideness of the gate, fifteen feet. But all this is now walled up to the narrow door before mentioned. * * As soon as you are entered within the court, you see the remainders of two rows of very noble marble pillars thirty-seven feet high, with their capitals of most exquisite carved work; as also must have been the cornishes between them, before by rude and superstitious hands they were broken down. Of these there are now no more than fifty-eight remaining entire; but there must have been a great many more, for they appear to have gone quite round the whole court, and to have supported a more spacious double piazza or cloister. Of this piazza the walks on the west side, which is opposed to the front of the temple, seem to have exceeded the other in beauty and spaciousness; and at each end thereof are two niches for statues at their full length, with their pedestals, borders, supporters, and canopies, carved with the greatest artifice and curiosity. The space within this once beautiful enclosure, which is now filled with nothing but the dirty huts of the inhabitants, I conceive to have been an open court, in the midst whereof stands the temple, encompassed with another row of pillars of a different order, and much higher than the former, being above fifty feet high. Of these remain now but sixteen; but there must have been about double that number. * * The whole space contained within these pillars we found to be fifty-nine yards in length, and in breadth near twenty-eight; in the midst of which space is the temple, extending in length more than thirty-three yards, and, in breadth, thirteen or fourteen. It points north and south, having a most magnificent entrance on the west, exactly in the middle of the building, which, by the small remains yet to be seen, seems to have been one of the most glorious structures in the world. I never saw vines and clusters of grapes cut in stone so bold, so lively, and so natural, in any place. * * Of this temple there is nothing at present but the outward walls standing, in which it is observable that, as the windows were not large, so they were made narrower towards the top than they were below; but all adorned with excellent carvings. Within the walls the Turks, or more probably the Mamalukes, have built a roof, which is supported by small pillars and arches; but a great deal lower, as well as in all other respects disproportionate and inferior to what the ancient covering must have been. And they have converted the place into a mosque, having added to the south end thereof new ornaments, after their manner, with Arabic inscriptions and sentences out of the Alcoran, wrote in flourishes and wreaths, not without art. But at the north end of the building, which is shut out of the mosque, are relics of much greater artifice and beauty."

Mr. Halifax's measurements are not very accurate, and we therefore refer the reader who is desirous of minuter details, to those given by the writer in the 'Edinburgh Encyclopædia.'

The wood-cut we have given at the head of this notice is taken from one of Mr. Wood's plates, which he describes as a 'View of the Temple from the north-west corner of the court.' The lofty columns in the foreground and on the left of the picture are a portion of the portico or colonnade, which runs round the interior of the court. Another portion of it is seen at the opposite extremity of the picture. The central pile is the Temple itself, surrounded by the remains of its peristyle. Among the broken columns and fragmen f cornices which crowd the foreground may be observed some of the flat-roofed huts of the Bedouins, who have taken up their residence in the court.

The entire number of distinct buildings, the ruins of which may still be traced in Palmyra, is between forty and fifty. But besides these there are multitudes of fragments scattered about everywhere, many of which doubtless have belonged to edifices that cannot now be distinguished. Next to the temple the most remarkable structure is the long portico mentioned in our former notice, which commences about 1200 feet to the north-west of the temple, and extends for nearly 4000 feet farther in the same direction.

All the buildings of Palmyra appear to be nearly of one age. Of the inscriptions which have been collected the most ancient is that on a lofty monumental tower, which is stated to have been erected by a person of the name of Iamblichus. It consists of five stories, and when Mr. Wood saw it both the stairs and floors were nearly entire. The inscription is dated in the third year of the Christian æra. The latest inscription which has been found, with the exception of the one in Latin, which belongs to the reign of Dioclesian, is older than the destruction of the city by Aurelian in the third century. All the buildings, the ruins of which can now be traced, therefore, were probably built within the first three hundred years after the birth of Christ. The character of the architecture would lead us to the same conclusion. It is nearly uniform in all the buildings, every one of which is of the Corinthian order. Wood discovered only four Ionic columns in the Temple of the Sun, and two more in one of the Mausoleums.

The period thus indicated was, in all probability, that of the greatest wealth and commercial prosperity of Palmyra. The subject of the commerce of this city has lately been investigated with great learning and ingenuity by Professor Heeren of Gottingen, in a paper read before the Royal Society there. An account of this interesting disquisition may be found in the third number of the 'Journal of Education,' pp. 134—143. Professor Heeren has chiefly deduced his conclusions from the inscriptions which have been copied from the ruins, and which may be found in the most correct form in Wood's book. Since that work was published, the Palmyrenian alphabet, in which some of the inscriptions are written, has been decyphered by Barthelemy; and all the inscriptions have been translated and explained by Eichhorn. Heeren supposes that the only native products of Palmyra must have been her dates and salt. A few miles south from the ruins there still exists a salt-valley. From the other parts of Arabia, however, and from India, the Palmyrene merchants appear to have imported for re-exportation to Europe, incense, myrrh, spices, pearls, precious stones, silk, and other manufactures. Camels were in all probability the carriers of these goods both from the east and to the west.

We subjoin the Oxford Prize Poem, on Palmyra, written by Ambrose Barber, Esq., of Wadham College.

PALMYRA.

O'er the hushed plain where sullen horror broods,
And darkest frown the Syrian solitudes,
Where morn's soft steps no balmy fragrance leave,
And parched and dewless is the couch of eve,
Thy form, pale city of the waste, appears
Like some faint vision of departed years.
In mazy cluster still, a giant train,
Thy sculptured fabrics whiten on the plain,
Still stretch thy columned vistas far away
The shadowed dimness of their long array.

But where the stirring crowd, the voice of strife,
The glow of action, and the thrill of life?
Hear! the loud crash of yon huge fragments' fall,
The pealing answer of each desert hall,
The night-bird shrieking from her secret cell,
And hollow winds the tale of ruin tell.

See fondly lingering Mithra's parting rays
Gild the proud towers once vocal with his praise;
But the cold altars clasping weeds entwine,
And Moslems worship at the godless shrine.

Yet here slow-pausing Memory loves to pour
Her magic influence o'er this pensive hour;
And oft as yon recesses deep prolong
The echoed sweetness of the Arab song,
Recalls that scene when Wisdom's sceptred child *
First broke the stillness of the lonely wild.
From air, from ocean, from earth's utmost clime,
The summoned genii heard the muttered rhyme;
The tasking spell their airy hands obeyed,
And Tadmor glittered in the palmy shade.
Lo! to her feet the tide of ages brings
The wealth of nations, and the pomp of kings;
And far her warrior queen from Parthia's plain
To the dark Æthiop spreads her ample reign:
Vain boast! e'en she who Immæ's field along
Waked fiercer frenzy in the patriot throng,
And sternly beauteous, like the meteor's light,
Shot through the tempest of Emesa's fight—
While trembling captives round the victor wait,
Hang on his eye, and catch the word of fate—
Zenobia's self must quail beneath his nod,
A kneeling suppliant to the mimic god.

But one there stood amid that abject throng,
In truth triumphant and in virtue strong:
Beamed on his brow the soul which, undismayed,
Smiled at the rod, and scorned the uplifted blade.
O'er thee, Palmyra, darkest seemed to lower
The boding terrors of that fatal hour;
Far from thy glade indignant Freedom fled,
And Hope, too, withered as Longinus bled.

* King Solomon.

CHANGES OF LANGUAGE.

In the 34th number of the 'Penny Magazine,' there is an article exhibiting the resemblance between the English and Flemish languages. From the following extract it will appear that Caxton, about 350 years since, was struck by the resemblance between our ancient English and the Dutch. The passage is otherwise interesting from the sort of proof which it affords of "the fleeting fashions of our English tongue." It is taken from Caxton's preface to his translation of the French version of the Æneid, and bears the date of 1490. We have modernized the orthography

Caxton states that, having no work in hand, he happened to meet with this book, which had lately appeared in French, and was so much delighted with the excellence of its style, that it seemed to him a work very requisite for noble men to see, as well for the eloquence as the histories." He then proceeds—

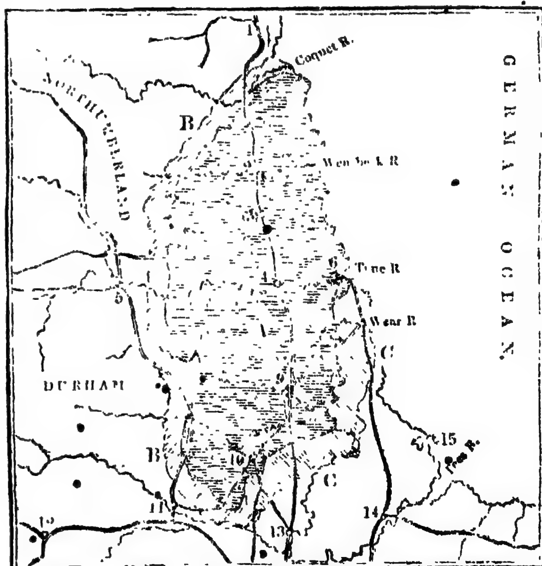
"And when I had advised me in this said book, I deliberated, and concluded to translate it into English; and forthwith took a pen and ink and wrote a leaf or two, which I oversaw again to correct it. And when I saw the fair and strange terms therein, I doubted that it should not please some gentlemen which late blamed me, saying that in my translations I had over curious terms, which could not be understood of common people, and desired me to use old and homely terms in my translations. And fain would I satisfy every man, and so to do took an old book and read therein, and certainly the English was so rude and broad that I could not well understand it. And also my Lord Abbot of Westminster did shew to me late certain evidences, written in old English, for to reduce it into our English now used. And, certainly, it was written in such wise that it was more like to Dutch than English. I could not reduce, nor bring it to be understood. And, certainly, our language now used varieth far from that which was used and spoken when I was born. For we Englishmen are born under the dominion of the moon, which is never stedfast, but ever wavering, waxing one season, and waneth and decreaseth another season. And that common English which is spoken in one shire varieth from another. Insomuch that in my days (it) happened that certain merchants were in a ship in (the) Thames for to have sailed over the sea into Zeeland, and for lack of wind they tarried at Foreland, and went to land for to refresh them. And one of them named Sheffelde, a mercer, came to a house and asked for meat, but especially he asked after eggs. And the good wife answered, that she could speak no French. And the merchant was angry, for he also could speak no French, and would have had eggs, and she understood him not. And then, at last, another said that he would have eyren *; then the good wife said that she understood him well. Lo! what should a man in these days now write, eggs or eyren? Certainly it is hard to please every man because of diversity and change of language. For in these days every man that is in any reputation in his country will utter his communication and matters in such manners and terms that few men shall understand them. And some honest and great clerks have been with me, and desired me to write the most curious terms that I could find. And thus, between plain, rude, and curious, I stand abashed; but in my judgment the common terms that are daily used are lighter (easier) to be understood than the old and ancient English. And, forasmuch as this book is not for a rude and uplandish man to labour therein, nor read it, but only for a clerk or noble gentleman, that feeleth and understandeth in feats of arms, in love and in noble chivalry: therefore, in mean between both, I have reduced and translated this same book into our English, not over rude nor curious, but in such terms as shall be understood, by God's grace, according to my copy."—*Ames' Typographical Antiquities*, Vol. I., pp. 68, 69.

* The plural of the Saxon *eye*, egg.

MINERAL KINGDOM.—Section 19.

COAL.

The Newcastle Coal Field is by far the most important of all those at present worked in England, either as regards the extent of the works, the productiveness of the mines, the quality of the fuel, or the markets which it supplies. The area covered by this coal-field will be seen by the following map:—



A. The coal field, tinted with horizontal lines.
B. B. Mill-stone grit, tinted with lines sloping to the right.
C. C. Magnesian limestone, tinted with lines sloping to the left.

1. Alnwick.	6. North Shields.	11. Barnard Castle.
2. Morpeth.	7. South Shields.	12. Appleby.
3. Stannington.	8. Sunderland.	13. Darlington.
4. Newcastle.	9. Durham.	14. Stockton.
5. Hexham.	10. Bishop Auckland.	15. Hartlepool.

The length of the coal-field, from the Tees to the Coquet, is almost fifty-five miles; its greatest breadth, between the mouth of the Tyne and the Western Pits, about twenty-two miles. It is bounded on the east from a short distance south of Shields very nearly to its southern termination, by strata of magnesian limestone,

under which the coal-measures have been found to be prolonged in many places; along the northern half of its eastern limit, the coal measures are exposed in the cliffs on the sea-shore. The whole of the western side is bounded by a coarse sandstone called the Millstone Grit, upon which the coal-measures repose. (See diagram in No. 51, 19th January,—L, M, N.).

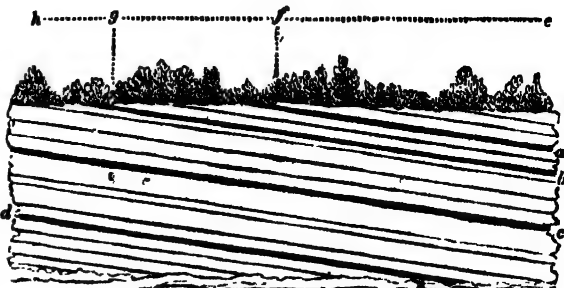
The entire area contained within those limits is occupied by the Coal Formation; that is, by beds of sandstone and shale, of great variety of composition and thickness, interstratified with seams of coal, also of different degrees of thickness. The valuable seams of coal are in general very deep beneath the surface of the ground, and are got at by a circular opening like a well, called a shaft, which is sunk perpendicularly through the strata. The following enumeration of the different strata thus passed through in order to get at workable seams of coal in Bigge's Main Colliery, to the depth of 1158 feet, will show the numerous alternations of which the coal-measures consist in the Newcastle Coal Field. The section is one of several given by Mr. N. J. Winch, a practical mining engineer, in his 'Observations on the Geology of Northumberland and Durham,' published in the 4th volume of the 'Transactions of the Geological Society.'

	ft.	in.
1. From the surface of the ground they sunk through clay to the depth of	102	
2. Through sandstone	42	6
3. They then came upon the first seam of coal, but which had only a thickness of......		8
4. From this seam to the thick bed called the High Main Coal of the Tyne, they sunk through 29 different beds of sandstone and shale, varying in thickness from 40 inches to 31 feet, interstratified with 8 seams of coal from 5 to 18 inches thick, amounting together to	418	2
5. The High Main Coal of the Tyne had here a thickness of.....................	6	8
6. From this seam they sunk farther through 52 beds of sandstone and shale, varying from 5 inches to 34 feet in thickness, interstratified with 19 different seams of coal from 2 to 37 inches thick, and amounting together to..............	503	2
7. They now came upon the seam of coal called the Low Main Coal of the Tyne, which had in this pit a thickness of	2	9
8. And they sank beneath this through 10 different beds of stone, from 12 inches to 12 feet thick, and two seams of coal of 4 and 12 inches, making together...........	82	
and giving a total depth of	1158	

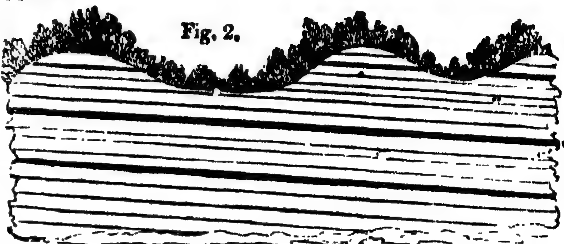
having passed through 125 different strata, including 32 seams of coal, 19 of which have been worked.

The coal-measures are not spread horizontally over the area, but lie in an inclined position, and at different angles of inclination in different parts of it. The consequence of this is, that the same seams are found at much greater depths from the surface in one colliery than in another. Nor will two distant parts of the field give the same succession of strata in a vertical section, either as regards the beds of stone, or the seams of coal, in point of quality and thickness: the same seam of coal swells out in one place, and in another thins off so much as not to be worth working, and the same thing occurs with the sandstone and shale; a bed of stone or seam of coal, which in one pit is scarcely perceptible, will increase in another pit to several feet. Neither is it to be understood that these coal strata are continuous over the whole area: although that they once were so is more than probable. In many parts of the district, a vertical section of the ground would at one time have presented an appearance similar to the following:—

Fig. 1.



but a section now shows that the surface has been deeply indented, and great portions of the superior strata have been carried away, so that it exhibits the following appearance.


Fig. 2.

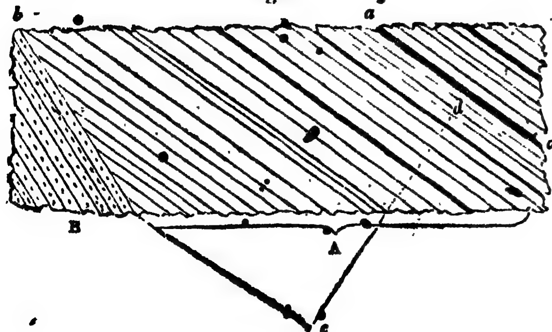
This deep furrowing of the land, which is common more or less to every coal-field in the island, has been ascribed by geologists to the action of great floods at a period antecedent to all human records, carrying along with them gravel and blocks of stone, which have ploughed up the ground and borne off the loosened materials to be afterwards deposited in distant parts, leaving behind them extensive valleys. The effect of this action has been called denudation by geologists; and the valleys so formed, which are not peculiar to coal-fields, but exist in many other parts of England, are called valleys of denudation. The Weald of Sussex and Kent, between the South Downs and the North Downs, is a remarkable example on a great scale; and those who wish to understand the subject will find a very clear explanation of the formation of the Weald, in Dr. Fitton's 'Geological Sketch of the Environs of Hastings,' (Longman, 1833) and in Lyell's 'Principles of Geology,' vol. iii. ch. xxi. The surface of the Coal Field of Northumberland and Durham has been scooped out in a remarkable degree by these denudations. The valley through which the river Teame runs extends from north to south, between the Wear and Tyne, and is between one and two miles broad. The coal measures must here have been originally continuous, entirely across the valley from hill to hill; but they have been excavated and carried bodily away, not only to the level of the bed of the Teame, but to the amount of sometimes more than 180 feet beneath the actual bed of that river. Under the surface of the fields, on both sides of the Teame, drifted rubbish and gravel fill a broad and deep trough in the coal-measures; from this trough and the valley above it, there has been a total removal of the superior strata, including several seams of coal, which had they been continuous in their original extent would have been highly valuable. (The hollows in the surface of Fig. 2 will make this account of the denudation of the valley of the Teame more intelligible.) The High Main Coal appears in the sides of the hills, on the east and west of the valley; another workable seam, a yard thick, is cut off by the gravel on each side of the trough; and the Low Main Coal is continuous across the valley beneath the trough. Another denudation has taken place in the valley of the Derwent, the next valley above the Teame; and one of much greater extent is that of the whole breadth of the valley of the Tyne, above Newcastle. A large part of these three denudations is

in the upper portion of the strata, and the destruction of coal has been immense. Dr. Buckland, in his evidence before the Committee of the House of Commons, above alluded to, states that he considers it probable that one half of the uppermost and best beds of coal, on the west and south of Newcastle, have been destroyed by denudation.

There are, besides, several parts of the district where, although the other beds of the Coal Formation exist the seams of coal are either altogether wanting, or are so mixed with bands or layers of stone, or are so thin, that they would not pay the expense of working them at the prices which can at present be obtained for the coals. It also frequently happens that, by the inclined position of the strata, the superior beds containing the best coal terminate at the surface, or *crop out*, as the miners call it. Thus, in Figure 1, the seam of coal *a*, which would be found by sinking a pit in any part of the country between *e* and *f*, crops out at *f* and there terminates: in like manner the seam *b* crops out at *g*, and thus in the country between *g* and *h*, instead of having the three seams of coal, *a*, *b*, *c*, they have only the last of these. If they go deep in sinking their shaft, they may come upon the seam of coal *d*, which the inclination of the strata may have brought within their reach, but which was unavailable in the country from *e* to *f* on account of its great depth. All the most valuable mines in the southern division of the coal-field are situated between the river Wear and the magnesian limestone which bounds the coal-field on the east; and a large proportion of the country west of the Wear, by this cropping out of the beds is occupied by barren strata of sandstone and shale, containing, occasionally only, a few small and unimportant seams, but no good workable beds of coal: and there is an enormous thickness of barren coal-measures beneath the low main coal, that crop out westward between Newcastle and the mountain called Cross Fell. It is probable, too, that along the whole west frontier of the triangular portion of the coal-field north of the Tyne, one-half of the area is occupied by strata barren of workable coal.

No bed of coal is uniformly good throughout any great extent: the high main coal is for many miles so deteriorated in quality, and so mixed up with stone, that it becomes worthless in many places. The coal seams worked in this field vary from eighteen inches to fourteen feet in thickness; but in the thick seams there is always a considerable portion of such bad quality as not to be saleable at a profit; and the best quality is seldom more than about six or seven feet thick. Throughout the whole of this field the best coals are those in the superior part of the series of strata of which the formation is composed. The best beds are those called by the miners the high main and the low main; and deep as the latter is for mining operations, it is quite a superior bed, if we compare that depth with the enormous thickness of the sandstone and shale beneath it. This thickness of the inferior strata is not ascertained by sinking under the low main coal, but by the position of the strata, as will be readily understood by the following diagram:—

Fig. 3.



Suppose the strata A to be the coal-measures lying in inclined stratification, uniformly one over the other, until they come to the older deposit of millstone grit B, and that *a* is the low main coal. It is obvious that the thickness of the strata under the low main coal must be the length of a line drawn perpendicular to the inclination of the strata, from the lower surface of the coal to the lower surface of the stratum which rests upon the millstone grit, that is, the line *d c*; now as the distance in the surface of the ground from *a* to *b* may be several miles, the depth from the surface to the low main coal bears but a small proportion to the thickness of the strata beneath it. It is thus that geologists estimate the thickness of a series of strata; from which it appears that they see much deeper into the structure of the crust of the globe than is commonly supposed.

We have said that the coal-measures have been found to be prolonged under the strata of magnesian limestone, which bounds the coal-field on the south-east. It was supposed, till of late years, to cut off the coal-measures in that direction; but coal has been worked under the limestone at Hatton colliery, and there are some ancient works under it at Ferry Hill, and some other places in the county of Durham. There are, however, great difficulties in excavating the coal from under the limestone, from two causes; in the first place, there is a want of conformity of stratification between the beds of limestone and the inferior coal-measures, so that no examination of the dip of the limestone would give an idea of that of the beds below; and, secondly, there is interposed between the limestone and the coal-measures an extremely irregular bed of sand or sandstone, which gives passage to an enormous quantity of water.

Most of the particulars stated in the latter part of this Section bear upon the important question of the probable duration of the Newcastle coal-field. This subject we shall discuss after we have described the mode of working the mines and some of the difficulties and dangers attending it, and which we propose to do in our next Section.

THE LABOURERS OF EUROPE.—No. 8.

(*France, concluded.*)

After having exhibited the condition of the labourers of France such as it was before the Revolution, and afterwards under the reign of Bonaparte, it remains for us to examine their present circumstances, since the peace, and under the constitutional government of the Charter.

In 1827, Mr. Charles Dupin, the French political economist, observed that, "In five-sixths of France, the agricultural implements are still of the rudest form. They are so badly constructed, so ill adapted to the animal power which sets them in motion, that they cause one-half of it, two-thirds, and sometimes three-fourths, to be wasted. * * There are still some parts of France where the people have not a sufficient number of domestic animals to prevent the women being employed as beasts of burden or draught: they drag barrows and dung-carts, carry heavy burdens, drive the plough, and share the most irksome labours. Borne down by excessive toil,—exposed to the sun, the rain, and the snow,—these women have their faces, hands, feet, and neck covered with a dark-tanned skin, which makes them resemble Hottentots, while their hard, angular features remind one of Tartars." Yet he acknowledges that many improvements had taken place. Agricultural societies have been formed in the chief towns of the departments, which have become a sort of school of mutual instruction for farmers. The introduction of artificial fodder for cattle, such as lucerne, vetches, clover, mangel wurzel, &c., has proved very beneficial. Attention has been paid to ameliorate the breed of horses. The cattle are better fed than formerly; a number are imported from Germany in a lean condition, and fattened in France. The breed of sheep has also been much improved. The cottages of the peasants are also kept

somewhat cleaner; their windows are now mostly glazed. But all these improvements are partial, and confined to certain localities; and it can hardly be otherwise in a country where the great mass of the landed proprietors are poor, low, and ignorant,—where one half of them at least cannot read. The small proprietors of land, together with the métayers, of whom we shall presently speak again, amount to four millions, and their families probably to twelve millions more. It is easy, therefore, to calculate the injurious effects of the ignorance in which the majority of this immense class have been brought up, by the want of elementary instruction in the communes or parishes, 15,000 of which have been till now left without teachers of any sort. The law that passed the House of Deputies in the session of the present year, for the establishment of primary instruction all over the country, will slowly but surely ameliorate the condition of the peasantry.

The system of letting land to *métayers*, who give the landlord one half of the produce, which is too deeply rooted in France to be easily or speedily altered, is another great cause of the depression of French agriculture. The *Revue Trimestrielle* or French Quarterly Review, for April, 1828, observed that "in a very large part of the kingdom, in all the central provinces, farmers are hardly known; that not less than one half of the whole soil of France is cultivated by unfortunate métayers, who engage to occupy the land for a period of three years, and to cultivate it, paying half the produce to the proprietor as rent. The proprietor supplies the stock indispensable to its petty farming, the grain required for the first sowing as well as for the support of the métayer and his family until the first harvest. The métayer works, sows, reaps; and he and his family feed on the produce, after which the proprietor gets the remainder. Sometimes a middleman, under the name of a farmer, is interposed between the landlord and the métayer." The introduction of these middlemen has, of course, a tendency to increase the obstructions to improvement which appear to be a necessary condition of the métayer system in its best form. Even in those provinces where leases are in practice, their duration is too short to enable the farmer to indemnify himself for the outlay which the introduction of new methods of cultivation would require. The system of cultivation by a rotation of crops is followed in French Flanders and a few more provinces.

We must say something of the present taxation of France. The tax, or *contribution foncière* as the French call it, is one of the main sources of the French revenue. It has replaced the old *taille*, and is heavier than the latter was, but is more equally distributed. This tax is levied on all lands and houses in proportion to their net revenue. There are, besides, the personal contribution and the *mobilière*. The personal is a kind of poll-tax, rated at three days' labour;—the value of the day's labour is fixed by the council-general of the department. The highest rate is one franc and a half (1*s.* 8*d.*), per day; the lowest is eighty centimes, or 8*d.* Women and boys under eighteen years of age are exempt. The *mobilière* (tax upon moveables) is levied according to the rent of each dwelling, 3 per cent. on the rent; and levied on all rents from 200 to 2500 francs, which is the maximum to which the per centage extends. No person pays less than five francs nor more than eighty francs a year, for which the landlord is answerable to the government. In Paris and other large cities, where it would be difficult to estimate the amount of three days' labour, in lieu of the personal tax a duty is levied on all articles of consumption which enter the town, which is called *octroi.* This produces in Paris alone four millions per annum. There is also a graduated door and window-tax. The general amount of the property-tax is voted every year by the legislature, when the quota of each department is also fixed. The amount seldom varies, but when an additional sum is required for the revenue, the Chambers vote what are called *additional centimes*, so much per cent. above the original tax. The local expenses of each department are likewise supplied by levying additional cents according to the exigencies of the year. These are called *centimes facultatifs.* And the communes raise also their *centimes communaux*, to supply their local wants. See Goldsmith's 'Statistics of France,' 1832.

The prohibitive system to which France still tenaciously adheres in her Custom-house regulations is undoubtedly injurious to several branches of her agriculture. Her wines, her staple produce for exportation, which give employment to three millions of people, being one-tenth of her population, and in the quality of which she is unrivalled, are sold on the spot for from a halfpenny to three halfpence a bottle, while the exportation has diminished one-half of what it was previous to 1790. In a petition from the wine-growers of the department of La Gironde, dated 1828, the particulars and the causes of this decline were stated at full length. The causes resolve themselves into this short sentence: "the fatal delusion of attempting to sell to foreigners without buying of them." Iron and linen, the principal equivalents which the north of Europe has to give in exchange for French wine and brandy, are in a manner prohibited by the enormous duties laid on those articles by the government of France, in order to encourage, as it is called, the native manufacturer. The consequence has been that the importation of French wines into Prussia has declined from 15,000 tuns to 4000, that into Sweden from 7000 tuns to 100 only, into Denmark and Norway from 5000 to 1000, into Russia from 12,000 to 4000, and to Hamburg, Bremen, Lubeck, and Dantzic, from 46,000 to 15,000. See an interesting article on this curious subject in the 'Foreign Quarterly Review,' No. VI. January, 1829.

We must conclude this sketch of the state of French agriculture by repeating what we said at the beginning, namely, that in speaking of such an extensive country as France, allowance must be made for differences of localities, climate, and habits. The northern, eastern, and north-western provinces are the most depressed; the peasantry of Britany is still in a wretched half-savage state, that of Champagne is very poor, that of Picardy is little better off; Normandy is the best part of northern France. The central provinces are blessed with a good soil and fine climate, which compensate for other disadvantages, and render the existence of the people comparatively easy. In the southern provinces the wants of the people are less, provisions are cheap, and fuel and raiment less essential. But the habits of the southern peasant or farmer are totally different from those of the northern one, and no proper comparison can be instituted between the two. Upon the whole it may be stated that the agricultural population of France has improved within the last forty years, but that they would have improved infinitely more were it not for their ignorance, their inveterate habits of erroneous cultivation, the bad system of tilling land, the too great subdivision of property into small patches, and the mistaken fiscal or financial system of the country.

DISSOLUTION OF THE LONG PARLIAMENT BY CROMWELL.

The 16th of December is the anniversary of the day on which Oliver Cromwell assumed the title of Lord High Protector of England, Scotland, and Ireland, in the year 1653. We gave a sketch of the career of this extraordinary man in one of our early Numbers, when noticing the anniversary of his birth, on the 25th of April, 1599. We now present a copy of a painting by the late Benjamin West, the subject of which is one of the most famous events of Cromwell's history, his dissolution of the Long Parliament, on the 20th of April in the same

year in which he took upon him the supreme authority. This was the only dissolution of parliament that ever took place in St. Stephen's Chapel, and the scene was the most extraordinary of which the House of Commons ever was the theatre. The longest English parliament on record was Charles the Second's Long Parliament, which met on the 8th of May, 1661, and was not dissolved till the 24th of January, 1678, after it had existed sixteen years, eight months, and sixteen days; but what is commonly known by the name of the Long Parliament is its more famous predecessor, which first met on the 3rd of November, 1640, in the reign of Charles I. A history of this parliament would comprehend the beginning, progress, and completion of by far the greatest revolution England has undergone since it first became one kingdom; for assuredly neither the Norman Conquest, nor the Reformation, nor the Settlement of 1688, momentous as each of those changes was, will bear to be compared in magnitude with that brought about within the period in question. In the Revolution of 1649 the crown was not merely taken from one family and given to another, but the monarchy was utterly overthrown; and the church also, which had been merely reformed in the preceding century, was now entirely abolished.

These mighty things were done by the Long Parliament—which, however, as other such workers of great effects have frequently been, was at last mastered and destroyed by the very agencies it had itself called into being and employed to execute its purposes. The army, with which it had struck down the crown, proved equally irresistible when it turned round upon the representatives of the people. About the end of the year 1648, a few weeks before the trial and execution of the king, Colonel Pride having blockaded the House with a party of military, had forcibly seized forty-one of the members in the lobby, and had shut out above one hundred and sixty more, none of whom were ever again allowed to take their places. This clearing of the House, however, though it sufficed for that occasion, was not enough for the ultimate designs of the great director of all these operations. The desire to rule without parliaments, strong as it may have been in Charles, was certainly at least equally strong in his rival and successor Cromwell.

Cromwell was at this time residing in Whitehall; and various consultations had been held by him with his officers in reference to the matter which he had so much at heart. There is no reason, however, to believe that he had ever announced an intention of attempting more than to induce the parliament to dissolve itself. That body had for some time certainly lost entirely the regard and respect of the nation, and all parties longed to see its existence brought to a close. There was, however, no authority in the commonwealth by which it could be legally dissolved. A motion had been made by a military member, one of Cromwell's creatures, that the dissolution should take place; but it was negatived after debate, and the House proceeded with its business as usual. On this Colonel Ingoldsby proceeded to Whitehall, and finding Cromwell, told him what had taken place. He was, it is said, greatly enraged, and instantly commanded some of his officers to fetch a party of soldiers, with whom he forthwith marched down to the House.

Nothing affords more complete evidence of the surprise and trepidation by which all men were struck by this bold movement than the diversity of statement that characterises the several narrations of the affair; even of those drawn up by persons who must, it would appear, have had the very best means of information. Mr. Brayley, in an article in his 'Londiniana,' has collected together the accounts of Dugdale, Whitelocke, Bate, Ludlow, and Clarendon; and there is scarcely an incident in the story that is told in exactly the same way by all these writers. Some say that he proceeded into the House alone, leaving the soldiers in the lobby; others assert that he took a file of his musqueteers in with him. One account makes him never to have gone to a seat; according to another, he sat down and heard the debate for some time. He then, Ludlow informs us, addressed himself to St. John, the Chief Justice, telling him that "he was come to do that which grieved him to the very soul, and that he had earnestly, with tears, prayed to God against it, nay, that he had rather be torn in pieces than do it, but that there was a necessity laid upon him therein, in honour to the glory of God and the good of the nation." This was spoken so as not to be generally heard. Immediately after he called to Major General Harrison, who was on the other side of the House, to come to him, and to him he declared that "he judged the parliament ripe for a dissolution, and this to be the time of doing it." Harrison requested him to consider seriously before attempting a thing so great and dangerous. "You say well," he replied, and sat still for about a quarter of an hour longer, till, the debate having closed, the question was about to be put. He then said again to Harrison, "This is the time I must do it," and suddenly starting up, first addressed some violent reproaches to the Speaker, alleging that the parliament had cheated the country, and displayed only the grossest venality; and then, stamping with his foot, he, in a furious manner, desired the Speaker to leave the chair and called out to the House, according to Bate, "For shame! get you gone! give place to honester men, and those that will more faithfully discharge their trust." Ludlow says, he told them that the Lord had done with them, and had chosen other instruments for the carrying on his work that were more worthy.

Although several of the members rose, one only had the boldness to speak, in spite of his commands that they should remain silent. This member, who has been thought to be Sir Peter Wentworth, inveighed in bitter terms against the atrocity of the proceeding. He had not, however, uttered more than a sentence or two, when Cromwell, stepping into the middle of the House, cut him short, by exclaiming "Come! come! quick, put an end to your sitting; call them in! call them in!" Two files of musqueteers now marched into the House. On this, Sir Harry Vane called out from his place, "This is not honest; yea, it is against morality and common honesty." "Oh! Sir Harry Vane! Sir Harry Vane!" answered Cromwell, "the Lord deliver me from Sir Harry Vane!" He followed these words by a string of invectives addressed to other individual members. The whole was now a scene of confusion and uproar. This is the moment which West has chosen. The Speaker is still in his chair, in vain endeavouring to calm the disorder. The clerks also retain their places at the table; but in front of that stands the dictator, pointing with emphatic contempt to the mace, the venerated symbol of the dignity of the assembly, and calling to one of the soldiers, who is obeying his orders, "Take away that fool's bauble." Of the rest of the troops, some are at his back, and others are seen with their raised halberts mixed with the members in every part of the House, and endeavouring to prevent the attempts of several of them to speak. The person on the left of the picture, who is seen stretching forth his hands in an attitude of such vehement enthusiasm, and who has evidently arrested Cromwell's eye as he is issuing his command for the removal of the mace, may be supposed to be Wentworth or Vane, protesting against that last excess of indignity and outrage. The Speaker, having declined to leave his chair until he was forced, was handed down from it by Harrison. All the other members then retired, Cromwell remaining till the last had left the House. He then ordered the doors to be locked, and walked away.

It is worth while to add the passage which Mr. Brayley has quoted from Whitelocke's 'Memorials.' "Among

all the parliament men," says this writer, "of whom many wore swords, and would sometimes brag high, not one man offered to draw his sword against Cromwell, or to make the least resistance against him, but all of them tamely departed the house; and thus it pleased God that this assembly, famous through the world for its undertakings, actions, and successes, having subdued all their enemies, were themselves overthrown and ruined by their servants; and those whom they had raised now pulled down their masters. An example never to be forgotten, and scarce to be paralleled in any story, by which all persons may be instructed how uncertain and subject to change all worldly affairs are; how apt to fall when we think them highest; how God makes use of strange and unexpected means to bring his purposes to pass."



[Cromwell dissolving the Long Parliament.]

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THE AURORA BOREALIS.



[Aurora Borealis.]

The Aurora Borealis is a beautifully luminous meteor, appearing in the form of streams of light, rays, arches, and crowns. A description of this splendid phenomenon, which enlivens the long darkness of the Arctic regions, has been given by Mr. A. De Capell Brooke, in his 'Winter in Lapland,' to which work we are indebted for the subject of our cut. But we shall take the liberty to condense his account, and to generalize it by some details from other sources.

He states, that in September the approach of the winter season led to the expectation that the Northern Lights would soon appear, and in the hope of observing them he generally walked out after dark. On the 21st he first obtained a sight of them. The night was clear and frosty, with little or no wind, and, on going out about midnight, the heavens were perfectly illuminated. The lights flitted along with amazing velocity in large patches of a pale hue, without assuming any defined form. They proceeded from the north-east, disappearing in the opposite quarter, and continuing to rise at intervals behind the Soröe mountains. Subsequent observations showed this to be so generally the course of the Aurora, that he habitually directed his attention to the north-eastern part of the horizon when watching for it. Its first appearance was generally that of irregular gleams of light, which exhibited an exact resemblance to the reflexion of a distant fire; and rarely remained low in the horizon, but mounted up towards the zenith, and there assumed an inconceivable variety of form and diversity of motion.

The appearances of the Aurora increased in number and brilliancy with the advance of the season. Sometimes it formed a splendid arch across the heavens, of pale lambent flame, running with inconceivable velocity, and resembling the spiral motions of a serpent. This arched form of the Aurora seems the most magnificent of all its diversified appearances, and we are enabled, from other observers, to furnish a more particular description than Mr. Brooke supplies. The arches are sometimes single; and sometimes several concentric ones appear; but, generally, they rarely exceed five, and are seldom limited to one. They are sometimes composed of a continuous stream of light, bright at the horizon and increasing in brilliancy at the zenith; and, when the internal motion is rapid, and the light brilliant, the beams of which they are composed are discernible. This internal motion appears as a sudden glow, not proceeding from any visible concentration of matter, but bursting forth in several parts of the arch, as if an ignition of combustible matter had taken place, and spreading itself rapidly towards each extremity. Mr. De Capell Brooke, in the inscription of the plate which we have copied above, says, "The Author in his travelling-dress as he travelled through Lapland, with an appearance of the Northern Lights." The arch in the plate is defined at the top; but in the arches described by Captain Parry, the

lower part only was generally well defined, the space under it appearing dark as if a black cloud had been there, which, however, was not the case, as the stars were seen in it unobscured except by the light of the Aurora. The revolution of an arch from north to south occupies at different periods a space of time varying from twenty minutes to two hours; and sometimes it appears stationary for several hours together.

Innumerable streams of white or yellowish light appear sometimes to occupy the greater portion of the heavens to the south of the zenith. Some of these streams of light are in soft lines like rays, others crooked and waving in all sorts of irregular figures, and moving with great rapidity in various directions. Among these might frequently be observed the shorter collections or bundles of rays, which, moving with greater velocity than the rest, have acquired the name of *merry dancers*.

Total darkness would sometimes ensue from the sudden disappearance of the Aurora; and then it would as suddenly reappear in forms altogether different from those which preceded, overspreading the sky with sheets of silvery light, wafted quickly along, like thin strata of clouds, before the wind. Sometimes narrow streaks of flame shoot forth with extreme velocity, traversing in a few seconds the entire concave of the heavens, and disappearing beneath the south-eastern horizon. Occasionally broad masses of light suddenly appear in the zenith, and descend towards the earth in the form of beautiful continuous radiated circles.

Speaking generally, the lustre of the polar lights may be described as varying in kind as well as intensity. Sometimes it is pearly, sometimes imperfectly vitreous, sometimes also metallic. Its degree of intensity varies from a very faint radiance to a light nearly equal to that of the moon.

The colours of the Aurora Borealis are of various tints, and do not seem to depend on the presence of any luminary, but to be generated by the motion of the beams. The *rays* or *beams* are steel-grey, yellowish-grey, pea-green, celandine-green, gold-yellow, violet-blue, purple; sometimes rose-red, crimson-red, blood-red, greenish-red, orange-red, and lake-red. Some of the beams appear as if tinged with black, and resemble dense columns of smoke. The arches are sometimes nearly black, passing into violet-blue, grey, gold-yellow, or white, bounded by an edge of yellow. The colours are also sometimes vivid and prismatic. Maupertuis describes a very remarkable red-coloured polar light, which he observed at Oswer Zornea on the 18th of December, 1786. An extensive region of the heavens towards the south appeared tinged of so lively a red, that the whole constellation Orion seemed as if dyed with blood. The light was for some time fixed, but soon became moveable, and after having successively assumed all the tints of violet and blue, it formed a dome, the summit of which approached the zenith in the south-west. Its splendour was so great as to be in no degree affected by the bright light of the moon.

Early observers were disposed to assign to the Aurora an immense elevation above the surface of the earth. The height of that seen in 1737 was computed at 825 miles. Bergmann, from a mean of thirty computations, forms an average estimate at 460 miles. Euler gives the altitude of several thousand miles to the Aurora; and Mairan fixes the elevation of the greatest number at 600 miles at least. Dr. Blagden brought it down to 100; and Mr. Dalton could not assign a less elevation to the Aurora seen in this country in 1826. But the result of the observations made by the several arctic expeditions seems to be, that the height of the Aurora is different at different times; it often occurs at elevations much higher than the region of clouds; though instances are mentioned by Captain Franklin and Dr. Richardson, in which the Aurora has been seen at a less elevation than that of dense clouds, the *under* surfaces of which they often saw illuminated by the meteor.

The magnetic property of the Aurora—or its power of agitating the magnetic needle—had long been suspected by philosophers; and though still doubted by some, and not confirmed by the observations of Captains Parry and Foster, seems now sufficiently established by the observations of Captain Franklin, Lieutenant Hood, and Dr. Richardson. At present, however, little more than the fact seems to have been ascertained; as great obscurity still hangs over the cause from which this effect proceeds, and the mode of its operation; and it sometimes happens that one observation has a tendency to neutralise the conclusion to which another would lead. The Aurora sometimes approached the zenith without producing the usual effect on the position of the needle. It is generally most active where it seems to have emerged from behind a cloud; and the oscillations appear only to take place when beams or fringes of the meteor are on the same plane with the dip of the needle. Captain Franklin was led to consider that the effect of the Aurora on the needle varied with its height above the earth. That it did not depend on the brilliancy of the meteor was manifest, from the fact that, in hazy, cloudy nights, the needle deviated considerably, though no Aurora was then visible; and he felt unable to determine whether this proceeded from a concealed Aurora behind the clouds, or entirely from the state of the atmosphere. Clouds sometimes during the day assumed the forms of the Aurora, and he was inclined to connect with their appearance the deviation of the needle, which was occasionally observed at such times.

The appearance of the Aurora is said to be sometimes attended with singular noises. Though Parry, Franklin, Richardson, Scoresby and others never heard such noises, and Hood and Brooke only *think* they did, all express an inclination to defer to the uniform testimony of natives and residents so far as to admit that such sounds may be sometimes audible, but their rare occurrence is demonstrated by the fact, that Captain Franklin's party felt unable to confirm this report, though the appearance of the Aurora had been registered 343 times at Bear Lake in the season 1825-1826. The noise, as described, appears to be a sort of crackling, whizzing, rustling sound, compared to that of an electric spark,—to the falling of hail,—to the rustling of a large flag in a gale of wind,—to the noise made by a flock of sheep in breaking through a hedge,—to that caused by shaking or waving a piece of paper,—and to the rushing of wind. Professor Jameson declares his belief in the existence of such sounds, and states that he has himself heard them; but he affords no explanation of the phenomenon.

In the polar regions the Aurora begins to appear in August, and continues till May; but the lights are the most intensely luminous from November to March. The number observed in the season 1820-1821, at Fort Enterprise, is thus registered by Lieutenant Hood: In August 10, September 6, October 7, November 8, December 20, January 17, February 22, March 25, April 18; in May, the brightness prevented more than nine from being observed. This is more than double the number observed at Cumberland House in the same season.

The Aurora is very various in its duration. It sometimes appears and disappears in the course of a few minutes; at other times it lasts during all the night, and occasionally continues for two or three days together.

The Aurora has, at different times, been seen in most parts of northern and central Europe. Dr. Halley has left a description of one which appeared in 1716, and which attracted very general attention. Since that time they have frequently been seen in England. Ac

counts have been published of those which appeared in 1826 and 1831. In the Shetland Islands, the *merry dancers*, as they are there and elsewhere called, are the constant attendants of clear evenings, and serve materially to diminish the gloom of the long winter nights. It was for a long time doubtful whether this meteor was confined to our hemisphere, or made its appearance also in the other; but the observations of navigators have demonstrated that the Aurora occurs as well in the antarctic as the arctic regions, though with considerable diversity in the accompanying phenomena. It is, for instance, noticed that the Aurora Australis is generally of a whitish colour, whilst various tints are assumed by the Aurora Borealis.

MINERAL KINGDOM.—Section 20.

COAL.

The mode of working coal-mines varies in different parts of the country, partly on account of the situation of the seams of coal in the ground, and partly on account of customs peculiar to the spots. That which we are about to describe is the method usually adopted in the Newcastle Coal Field; the chief sources of information on the subject being contained in the evidence given before the Committees of the Houses of Lords and Commons in 1829 and 1830, by Mr. Buddle and Mr. Taylor, eminent engineers or coal viewers, and of large experience in the north of England collieries.

No instances occur in this country of beds of coal lying so near the surface that they can be worked in open day like a stone quarry, nor are they often met with in the side of a hill, so that the mines can be pushed forward in a horizontal direction. When, therefore, a coal-field is to be *won*, as it is technically called, that is, when the coals are to be taken out, the first step is to sink a perpendicular circular shaft like a great well, in order to get at the coal, and by which the miners or pitmen descend, and the coal is brought to the surface. The sum required for winning a field of coal, that is, the coal under a certain portion of land marked out on the surface, is sometimes so considerable, and the risk of failure so great, that very few individuals venture upon it on their sole account. They are usually won by a company, called adventurers, who take a lease from the proprietor. On the river Tyne there are only five proprietors, out of the forty-one collieries, who work their own mines, and on the river Wear there are only three out of eighteen collieries; all the rest are in the hands of lessees or adventurers. The capital is raised by shares, often of small amount, and being transferable are constantly in the market. Collieries vary exceedingly as to the amount of capital required to win them, the difference being so great as from £10,000 to £150,000. One of the difficulties in sinking a shaft is passing through quicksands; another is the immense quantities of water which are met with in certain parts of the stratification, generally within forty or fifty fathoms from the surface, which is always dammed back by a tub. Mr. Buddle mentions a shaft in which he had to apply forty fathoms, that is, 240 feet, of cast-iron tubbing. Besides, one shaft is not sufficient, another being required for drawing up the water and for ventilating the mine.

The depth of the mines is very various; in one place near Jarrow, about five miles from the mouth of the Tyne on its southern bank, the high main coal of the Tyne is found within 42 feet of the ground, and the same coal lies under Jarrow Lake more than 1200 feet from the surface. This great depth is not reached by one perpendicular shaft, but a shaft and steam-engine under ground, with descending inclined planes. A great improvement was made by this erection of steam-engines to be worked in the pits underground, and which first took place in 1804.

The pit having been sunk to a sufficiently thick seam of coal, the process of excavating it begins, by cutting out the coal laterally in what are called galleries. In the Newcastle mines large masses of the coal, named pillars, are left to support the roof, at short intervals; but in Staffordshire the whole of the coal is taken away, and the roof of the mine is suffered to fall down, care being taken to support it so far as not to endanger the safety of the workmen. One set of workmen is employed in digging out the coal, and another in removing it to the bottom of the shaft, from whence it is drawn up by machinery to the surface. The work of the miners is very laborious, especially where the seams are so thin as to prevent their being in an erect posture.

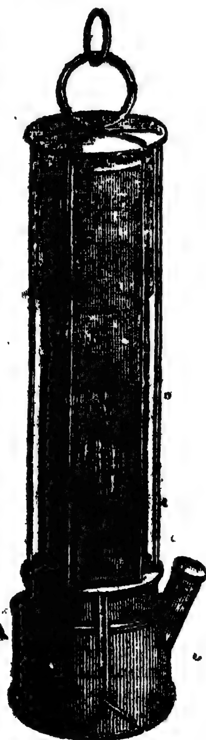
In many collieries, after the whole of the coal has been got out in the ordinary way of working, they gradually cut away a part of the pillars of coal which had been left at intervals, for the support of the roof, substituting props of timber; and sometimes the whole of the pillar may be taken away without the roof falling in in such a manner as to impede the workman in other parts of the mine. When the whole of the coal has been excavated and the roof does not fall down, vast empty spaces or wastes are left, which very generally after a while, become filled with water, to the great danger of the adjoining collieries.

The chief accidents to which collieries are exposed, besides that of the roof and floor coming together, by the pressure over the places where the coal has been worked out, are inundations of water, and explosions of gas. The quantity of water which flows into the mines is sometimes quite enormous, and the expense of drawing it off by pumps worked by steam-engines is one of the heaviest charges of a colliery. Mr. Buddle states, that in one with which he is connected, they draw eighteen times the weight of water which they do of coal. It very often happens that a mine is drowned by an accidental opening into an old working filled with water.

But of all the accidents to which coal-mines are exposed, the explosions of inflammable gas or fire-damp are the most frequent, and by far the most calamitous in their consequences. All coal, even the charcoal-like variety called anthracite, appears to contain, in its natural state while underground, a considerable quantity of free uncombined gas, which it parts with when exposed to the air, or when it is relieved from great superincumbent pressure. The gas is evolved from the coal in great quantity at the ordinary temperature of the mines; and instances have been known of explosions on board of ships laden with fresh-worked coals. Coals lying deep give out more gas than those near the surface, because there are openings at the surface by which it escapes; but in the deep mines it cannot have such an outlet, and therefore it accumulates in all the fissures of the stone above the coal, and this sort of natural distillation is constantly going on. The fissures of the roof are in some places very great, and there are sometimes miles of communication from one fissure to another: they may be considered as natural gasometers, and having no outlet, and the process of distillation constantly going on, the gas becomes accumulated in them in a very highly condensed state, the degree of condensation depending on the thickness of the surrounding rock and the quantity poured in. In the course of pursuing the workings the miners sometimes cut across one of those fissures, or approach so near to it, that the intervening rock becomes too weak to resist the elastic force of the compressed gas; it gives way, and then, in either case, the gas rushes out with immense force. These *blowers*, as they are called, emit sometimes as much as 700 hogsheads of gas in a minute, and continue in a state of activity for many months together. Sir James Lowther found a uniform current of gas in one of his mines for two years and nine months.

This gas, in the state in which it issues from the coal, burns with a bright flame, like ordinary artificial coal gas; but when united with a certain proportion of the air of the atmosphere, the mixture becomes explosive, that is, the whole volume of air, upon the approach of a flame, suddenly catches fire, and goes off like gunpowder, with a tremendous explosion. If there be more than one volume or bulk of the inflammable gas to fourteen of atmospheric air, the mixture is explosive, and must not be approached with a naked flame. Great pains are taken to ventilate the mines so as to free them from this foul air, by large fires kept constantly burning at the mouth of the ventilating shaft, aided very often by air-pumps worked by steam-engines, to quicken the draft; and which are sometimes so powerful as to draw out of the mine 1000 hogsheads of air in a minute. One mine is described by Mr. Buddle as generating so much gas as to require a supply of 18,000 cubic feet of atmospheric air in a minute to keep it in a safe working state. Men can continue to work and breathe in an explosive mixture of the gas without feeling any material inconvenience; and formerly such places were approached by making use of what were called Steel Mills, to give light. This machine consists of a small wheel of steel, of six or seven inches diameter, moved by a little toothed wheel with great velocity, and by holding a piece of flint to the steel, a stream of sparks is given out. Although in the day the light appears very feeble, in the darkness of the mines it is strong enough to enable one to write by it; but the use of the steel mill is not free from danger of explosion in certain mixtures of the gas. That contrivance has, however, been now completely set aside by the important and beautiful discovery of Sir Humphry Davy, the Safety-Lamp.

That eminent philosopher instituted a long series of experiments on the nature of the fire-damp, and on the proportions with which it must be mixed with atmospheric air in order to become explosive. He found that, in respect of combustibility, the fire-damp differs most materially from the other common inflammable gases, inasmuch as it requires a far higher temperature before it can be set on fire; an iron rod, at the highest degree of red heat, and at the common degree of white heat, did not inflame explosive mixtures of the fire-damp, and an explosion only took place when a flame was applied. He further made the important discovery, that flame will not pass through a tube with a very small bore; and, guided by this principle, he was ultimately led, through a train of ingenious experiments, to the construction of an instrument which has saved, and will continue to save, the lives of hundreds, and which has rendered a large extent of property productive that the proprietors were unable to turn to any profitable account. The accompanying is a representation of "The Davy," as the safety-lamp is now called by the miners, a very fit mode of perpetuating the remembrance of their benefactor:—



The construction of it is very simple: A. is the lamp, in which oil is used; and there is a small, bent wire, moved by passing smoothly through a hole in the bottom, for the purpose of trimming the wick. B. is a cover of fine wire-gauze, which is fastened upon the lamp, and generally locked to prevent the miners taking it off; and this cover is strengthened by upright wires, twisted at the top to receive a ring for carrying the lamp.

Some recent improvements have been lately introduced by the application of reflectors, for the purpose of concentrating the light. An account of the theory of this valuable instrument will, we have no doubt, be acceptable to our readers, and the following, which is partly taken from Dr. Turner's 'Elements of Chemistry,' will, we hope, make it easily understood. We have said that the construction of the lamp depends upon two principles discovered by Sir H. Davy, namely, that fire-damp will only explode at a very high temperature, and that flame will not pass through very fine tubes. Now the power of tubes in preventing the transmission of flame is not necessarily connected with any particular length, a very short one will have the effect, provided its diameter be proportionally reduced; and so Sir H. Davy, considering that fine wire-gauze is an assemblage of very short tubes with a very small bore, found that a gauze containing 625 apertures in a square inch, which is coarse enough to transmit a great deal of light, will not allow flame to pass through it. Any one may convince himself of this by holding a piece of fine wire-gauze over the flame of a candle, or, what is better, over the flame of a spirit-lamp, or of a gas-lamp, for in these cases the gauze becomes red-hot. Flame is gaseous matter heated so intensely as to be luminous, and, as we have said above, the flame of fire-damp is only kindled at a temperature much higher than that of iron at a white heat. Now when flame comes in contact with the sides of very minute apertures, as when wire-gauze is laid upon a burning jet of coal-gas, it is deprived of so much heat that its temperature instantly falls below the degree at which inflammation can be maintained, and consequently, although the gas itself is passing freely through the interstices, that portion of it which is above the gauze, although very hot, is not sufficiently so to be luminous,—that is, to be in a state of flame. Nor does this take place only when the wire is cold,—the effect is equally certain at any degree of heat which the flame can communicate to it; for since the gauze has a large extent of surface, and, from its metallic nature, is a good conductor, it loses heat with great rapidity. Its temperature, therefore, though it may be heated to whiteness, is always so far below that of flame as to exert a cooling influence over the burning gas, and reduce its heat below the point at which it is luminous. When the lamp is carried into a part of the mine which is highly charged with fire-damp, the flame of the wick begins to enlarge, and the air, if it contain so much of the inflammable gas as to be highly explosive, takes fire as soon as it has passed through the gauze, and then burning within the lamp extinguishes the flame of the wick, by cutting off all communication with the pure air of the atmosphere. Whenever this appearance is observed, the miner must instantly withdraw; for although the flaming gas within the lamp cannot pass through the gauze so as to set fire to the explosive mixture outside, it makes the wire gauze so hot that it would very speedily be wasted, and a hole, large enough to let the flame come out, would be burned.

Since the discovery of the Davy Lamp accidents by explosion have been considerably diminished, although we still hear too frequently of many lives being lost from this cause. These melancholy disasters are partly occasioned perhaps by venturing into too dangerous places, but most frequently by the carelessness and criminal daring of the workmen themselves, who, in order to get a little more light, take off the wire-gauze covering.

THE PARROT.



I. The Macaws. Tail long and pointed; cheeks naked.
A Psittacus Macao.
II. The Parrakeets. Tail long and graduated; cheeks feathered.
B Psittacus Carolinæ.
C Psittacus squamosus.
III. The Psittacules. Tail very short, and roundish at its termination; cheeks feathered.
D Psittacus melanopterus.
E "Psittacule des Phillipines." } { Very small parrots: about half as large again as a sparrow.

IV. The Parrots. Tail equal and squared; head destitute of moveable crest.
F Psittacus accipitrinus.
G Psittacus leucocephalus.
V. The Cockatoos. Tail equal and squared; head with a moveable crest.
H Psittacus sulphureus.
I Psittacus Banksii.
VI. Probosciger (Aras à trompe). Tail equal and squared; naked cheeks, and tuft on head.
K. Psittacus Goliath.

It does not seem necessary to enter into a detailed description of a bird so generally known as the parrot; it may suffice to state the principal characteristics which are common to all the different species of this splendid genus. Bill hooked, thick, and very hard and strong; the lower mandible short, obtuse, and turned up to the extremity; the upper mandible moveable, much curved downward to the point, and covered with a skinny case, which is pierced for open and orbicular nostrils. In most of the species the tongue is fleshy, obtuse, and entire. Feet formed for climbing with four toes, the two before united by a thin membrane at their bases, whilst the two behind are quite unconnected. The different species vary from the size of a swallow to that of a domestic fowl.

The parrot genus includes about one hundred and seventy known species. All the species are confined to warm climates, but their range is wider than Buffon considered, when he limited them to within 23° on each side of the equator; for they are known to extend as far south as the Straits of Magellan, and are found on the shores of Van Diemen's Land; and the Carolina parrot of the United States is resident as far to the north as 42°. Wilson saw them, in the month of February, along the banks of the Ohio, in a snow-storm, flying about like pigeons, and in full cry. And another time he saw them, about thirty miles above the mouth of the Kentucky River, as they came in great numbers, screaming through the wood, about an hour after sunrise, to drink the salt water, of which they are remarkably fond

Parrots live together in families, and seldom wander to any considerable distance; these societies admit with difficulty a stranger among them, though they live in great harmony with each other. They are fond of scratching each other's heads and necks; and, when they roost, nestle as closely as possible together, sometimes as many as thirty or forty sleeping in the hollow of the same tree. There they sleep in a perpendicular posture, clinging to the sides by their claws and bills. They are fond of sleep, and seem to retire into their holes several times in the day as if to enjoy a regular *siesta*.

The young shoots of various plants, tender buds, fruits, grains, and nuts, which they open with much adroitness to obtain the kernel, are the chief aliments which the parrots use when in a state of liberty. We know that, in a state of domestication, they eat almost everything that is offered to them; but it has been remarked that certain substances, such as parsley for instance, which have no sensible effect on other creatures, are to parrots mortal poisons. In the forests, which are their favourite retreats, the parrots assemble in troops, and cause much devastation by the vast quantity of food which they consume, not merely for their subsistence, but to gratify that mania for destruction for which, even in their domestic state, they are noted. The loud cries of these bands are heard a great way off, when they seek their last repast before the setting of the sun. By these cries the planter has timely warning to employ some means of preventing these hosts of destroyers from alighting on his newly-sown fields, where, in a short time, they would not leave a vestige of grain.

The description which Wilson gives of the flight of the Carolina parrot is probably applicable to many other species which have not, in their wild state, been noticed by an equally intelligent observer. "There is a remarkable contrast between their elegant manner of flight and their lame and crawling gait among the branches. They fly very much like the wild pigeon, in close compact bodies, and with great rapidity, making a loud and outrageous screaming. Their flight is sometimes in a direct line, but most usually circuitous, making a great variety of elegant and serpentine meanders, as if for pleasure."

Some species establish their nests on the summits of the highest trees. The nest is composed of small sticks and slender twigs, interlaced with as much art as solidity. The rest, and this is by far the greater number, choose the trunks of hollow trees. They there amass dust and arrange grass and the filaments of roots, dressing the interior with their own down. The female lays from two to four eggs, altogether white, and sits on them with great constancy, whilst the male keeps himself at a small distance from the nest, attending to all the wants of his mate.

We cannot pass over the sort of education of which parrots are susceptible. They learn to speak, and can retain and repeat a tolerably long series of words. This is the result of a forced modification of the voice, to which they have been brought by the habit of hearing the same words or sounds frequently repeated; and which, by the instinct of imitation common to all animals, but perhaps more strongly developed in the parrot than in most others, they are able to retain. But in this language, the thought or sentiment expressed is of no account. We often hear parrots in the paroxysms of choler, to which they are so subject, use the same endearing expressions, which, when they are calm, frequently seem very intelligent and to the purpose, because they are commonly the answers to a very circumscribed circle of questions. The most remarkable parrot on record is that which is known as Colonel O'Kelly's, a notice of which appeared in page 36 of this Volume of the Penny Magazine.

Account of a Library for Working Men.—A correspondent, who gives his name and address, has been induced, by our notice of Sir John Herschell's Address to the subscribers of the Windsor and Eton Public Library, in No. 95 of the 'Penny Magazine,' to send us an account of a similar institution on the Borders, with which he had been himself connected. He states that a gentleman, well known for his enlarged views of the state and prospects of society, being one evening in the place, was led to inquire whether there was any public library in the town. He was informed in reply, that there was one of ample extent, the entrance-money to which was £5, and the annual payment 14s. Feeling this to be beyond the reach of the poor, he inquired if there was no other library. He was told that there was the "Tradesman's Library," the entrance to which was £1, and the yearly payment 4s. This was nearer the point certainly, but still did not exactly meet the views from which this gentleman's inquiries had proceeded. "It will not supply the young," was his reply; "you must try another, to excite the desire of knowledge among the young and the poor." The minister of the parish, his lady, and a few other persons adopted the suggestion. In a few days £20 were freely and readily given, and the donors were called to a meeting in the town-hall. At this meeting some were for allowing to the readers the gratuitous use of the books, but the majority very properly doubted the prudence of this plan, and it was decided to cherish the natural desire of independence in the poorest and youngest by requiring the payment of a penny monthly. It was also agreed that the volumes should be of small extent, that they might be returned once a month or oftener. The sum raised procured about eighty volumes, and a donation from the first mover of the plan added twenty or thirty more. The second week after the commencement there were above one hundred applicants, of whom about thirty were poor labourers or solitary females, and a larger number were under fourteen years of age. Numbers of them had not read two hours in succession for many years before. At the beginning of the second year the readers were allowed, at their own desire, to pay for six months at once, instead of a penny monthly. Our correspondent relates the following anecdote, which illustrates the useful effect of such institutions upon those for whose benefit they are intended.

In the following spring, when the days were lengthened, one of the readers, an agricultural labourer, came with the book he had been using, and declined to take another. He stated that, labouring at a distance for so many hours, he should not be able, during the summer, to indulge his desire for more reading. On being asked if he thought his monthly penny had been well spent, his hard countenance assumed the air of one who had found a treasure as he

replied,—"Had I paid you a shilling a week instead of a monthly penny, myself and family would have been gainers. During the winter months I and those like me got home and took dinner between four and five o'clock. Then an ill-ordered house and a noisy family induced me and others to go out. If the weather was favourable, we stood to talk and spend an hour at the Cross; if otherwise, we went into a smithy for shelter, and often to the public-house, and, though I am not given to drink, yet we had to spend a little when there, and even a little frequently occurring is felt by a poor man. When I took home my first book from the library I was asked to read aloud, but objected because of the noisy children. After some time, the younger were put to sleep, and I began to read. Next morning, and every evening after, my house was clean and in order, the fireside trimmed, my meal waiting, the children in bed, or allowed to sit up on condition of listening as quietly as their attentive mother. The book we obtained from the library was Goldsmith's 'Animated Nature,' and it has been highly interesting to us. And, Sir, apart from all we have learned by reading, to find, week after week, my own house the most comfortable, and my own family the happiest I ever saw, shows me that a poor man with his book in his hand may be as happy as the richest or most noble." This man concluded with assuring our correspondent that he had heard from others' statements similar to that which he had made for himself.

MOUNT HECLA.

Some years ago, it was not uncommon for our sailors, on their way to Greenland and North America, to see a column of fire (whose base was a lofty peaked mountain) towering high in the air, and casting a ruddy glare over the dark, stormy seas for many a mile. This spectacle made a deep impression on the lively imagination of ignorant and superstitious seamen; who, returning to their homes, gave a naturally exaggerated description of what they had seen, and explained the phenomenon by assuming that it was produced by supernatural agency. This column of fire proceeded from Mount Hecla, which is one of the numerous volcanos we have mentioned in our short description of the island of Iceland. It is situated on the southern side of that island, at the distance of a few miles from the sea-coast; and, though neither so grand, as a mountain, nor so terrible, as the centre of volcanic action, as some of its neighbours, Hecla has been more celebrated than any of them, because, from its position, it has been more frequently seen by strangers, and because it has been more frequently in a state of eruption than any of the other volcanos.

The height of Hecla from the level of the sea is between four and five thousand feet. From some points of view its summit is seen divided into three peaks, of which the central peak is the loftiest and most acuminated: from other directions it seems to terminate in a single massy cone, like the volcano of Ætna.

One of the most singular features of Hecla, as compared with other volcanos, is the remarkable manner in which immense heaps of lava that have flowed from the mountain during different eruptions are ranged round its base, so as to form a sort of rampart from forty to seventy feet high. All travellers have been struck by the continuity and bright, glazed appearance of these walls. Von Troil calls them "high glazed cliffs,—lofty glazed walls," not to be compared to anything he had ever before seen; and Dr. Henderson describes them as "immense, rugged, vitrified walls," going all round the base of the mountain. To explain part of this appearance, it may be necessary to inform some of our readers that when lava passes from its liquid state and cools, it sometimes retains a shining, vitreous coat, not unlike glazed bricks, or some of the refuse thrown out of our glass-works. Beyond and above this immense rampart little more lava occurs, the rest of the mountain being composed almost entirely of sand and slags.

In 1772, the late Sir Joseph Banks, with Dr. Von Troil, Dr. Solander, and other friends, ascended Mount Hecla. The country for more than two leagues round it was wholly destitute of vegetation, the soil consisting of red and black cinders, scoriæ, pumice-stone, and other volcanic results; whilst here and there it rose into little hills and eminences, which were of greater size in proportion to their vicinity to the base of the mountain. These eminences, which were hollow within, were craters through which the subterraneous fire had at different times found vent. The largest of them, called Raud-Oldur, was described by Sir Joseph as a crater with an opening half a mile in circumference, and about one hundred and forty feet deep, having its western side destroyed, what remained being composed entirely of ashes, cinders, and pieces of lava in various states. Near to this crater the party pitched their tents, in the midst of a scene of almost inconceivable horror and desolation.

When they continued their route, and came to the rampart already described as surrounding the base of Hecla, they experienced considerable difficulty in climbing and crossing it, for they frequently found the lava lying in detached masses with deep holes between them. Having at length surmounted this difficulty, they found themselves on comparatively easy ground, and continued their ascent on the western side. Soon, however, they were somewhat alarmed by hearing a continual cracking beneath their feet. On stooping to examine whence this proceeded, they discovered that the whole mountain was composed of loose materials, easily broken, of sand and pumice-stone, lying in horizontal strata, everywhere full of fissures. Still continuing their ascent, they passed over a series of sloping terraces, and perceived that the sides of the mountain, from its summit to its base, were deeply scarred with ravines, formed originally by the descent of lava, but now serving as water-courses and beds for the winter torrents.

It was night when they gained the summit, and stood beside the great crater on a spot covered with ice and snow. The snows are not, however, of the nature of glaciers, as, except such portions as lie in hollows and clefts, they generally melt in the course of the summer. The cold at this time (in the month of June) was exceedingly severe. Sir Joseph Banks says that he and his companions were covered with ice in such a manner that their clothes were as stiff as buckram. The water they carried with them was all frozen. Here and there on the mountain-top they found great heat issuing from the ground and melting the snow for a little space round its vent. One of these spaces was so hot from steam and smoke that they could not remain on it; but they nowhere saw traces of the dangerous bogs, the waterfalls, the hot springs shooting in every direction, or the devouring flames, which the natives had stated to exist.

The silence and the solitude of the spot were awful. It was midnight, but in that northern latitude as bright as day: the prospect was immense. To the east they saw a long range of glaciers, beyond which the ancient volcano of Hoerdabreid presented its peak, which looked like a great castle; to the north were lofty hills and many lakes. The view, however, seems to have been the only very interesting thing they met with on the summit of Hecla. They descended on the western side by a very deep ravine, which, commencing at the top of the cone, and continuing to the very foot of the mountain, appears clearly to have been the bed of a prodigious stream of lava, and was probably formed during the eruption of 1300, when, as Icelandic chroniclers relate, Mount Hecla was rent from top to bottom. Large masses of rock, as cast out by the crater, still hung over the edges of the ravine, and greater heaps of melted and burnt substances were found at the bottom of this singular and immense chasm.

When Sir G. S. Mackenzie, Dr. Holland, and Mr,

Bright ascended this volcano in the summer of 1810, they found a much greater degree of heat proceeding from the mountain. Hot vapours issued from several parts of the central peak, and the heat of the ground was so great, that on removing a few of the slags from the surface, those a little below were too hot to be handled. On placing a thermometer amongst them, it rose to 144°. These gentlemen did not ascend by the western but the southern side; they found the ascent tolerably easy until they reached the upper and steepest part of the cone, which being covered with loose slags, they sometimes lost in one step the ground they had gained by several. During the ascent the mountain was for awhile enveloped in dense clouds, which prevented them from seeing the chasms in its sides, and they encountered some danger by crossing a narrow ridge of slags that connected one of the lower peaks with the highest. This passage, during which they had a precipice on either side of them, they effected by balancing themselves like rope-dancers. They found these superior craters very incompletely defined, their sides and lips being much shattered and broken away.

The last great eruption of Mount Hecla was in 1766. It broke out suddenly, and was attended at its commencement by an earthquake. It lasted without intermission from the 15th of April to the 7th of September, and did immense damage. The poor horses were so terrified, that they ran wildly about till they dropped down dead through fatigue. The people living near the mountain lost their cattle, which were either choked with the volcanic ashes or starved before they could be removed to grass. A few lingered for a year, and on being opened, the stomachs of these were found to be loaded with ashes.

Other volcanoes in Iceland, though less frequently in action, have caused much greater mischief than Hecla. In 1755 one of these threw out ashes that fell like rain on the Ferroe Islands, at the distance of more than three hundred miles. But the last great eruption (in 1783) was the most terrific of all that are recorded. This proceeded from the mountain of Skaptaa Jokul, and occasioned the desolation we have described in the first of these Icelandic sketches. The reader must understand that the nine thousand human lives were not all directly destroyed by fire or by ashes, but by starvation, the consequence of the burning up of all vegetation on which the flocks and herds subsisted, and of the disappearance of fish from the coasts. At that unhappy season an enormous column of fire cast its glare over the entire island, and was seen, from all sides, at sea, and at the distance of many leagues. Issuing forth with the fire, an immense quantity of brimstone, sand, pumice-stone, and ashes, were carried by the wind, and strewed over the devoted land. The continual smoke and steam darkened the sun, which in colour looked like blood. During the same summer the sun had a similar appearance in Great Britain, and the same obscurity reigned in most parts of our island. Many parts of Holland, Germany, and other countries in the north of Europe, were visited by brimstone vapours, thick smoke, and light grey ashes. Ships sailing between Copenhagen and Norway were covered with brimstone ashes, that stuck to their sails, masts, and decks.

The whole face of the island has been changed by these terrific convulsions, and Sir G. Mackenzie thinks he is safe in estimating that one continued surface of sixty thousand square miles has been subjected to the force of subterraneous fire in this part of the world



[Mount Hecla.]

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QUINTIN MESSYS, OR MATSYS.



The Misers, at Windsor Castle: by Quintin Messys, or Matsys.

In the state apartments of Windsor Castle is the celebrated picture called 'The Misers,' by Quintin Matsys, the Blacksmith of Antwerp. This picture invariably arrests the attention of visitors. The brilliancy of the colouring, the strong characteristic expression of the two old men, and the minute accuracy of all the objects by which they are surrounded, afford a pleasure which is sometimes not created at first by the productions of a

higher species of art, which demand attentive examination and some degree of knowledge. Everybody can judge of a painting which aspires only to be a faithful representation of some familiar scene. 'The Misers' are probably portraits of two money-changers or bankers of the days of the painter; who are amicably employed in counting over their coins and jewels—not with the careworn self-denial of the 'miser,' but with a joyous satisfaction, such as thriving citizens might reasonably feel. The spectator also takes a new interest in this painting, from the traditionary story connected with it, which we shall notice in the following brief memoir of the artist.

The name of this Flemish painter is given in a great variety of forms by different authorities. In this country he is commonly called Matsys; he was born, it is believed, at Antwerp, although some say at Louvain, in 1460. His history is romantic and interesting. All the accounts agree that he was bred to the business of a blacksmith or farrier; and hence he is often designated the Blacksmith of Antwerp. It is said that he followed this occupation till he was twenty years of age, if not older. We then have different stories as to the circumstances connected with his relinquishment of the sledge-hammer and the anvil for more easily-wielded instruments of design. We may observe, that an academy for the cultivation of painting, and the other fine arts, had been established in the city of Antwerp in 1454; and that it is recorded to have had the effect of awakening, throughout the Netherlands, a strong interest in these pursuits. According to one account, Messys showed a decided inclination and talent for design when a child, and would have chosen the profession of a painter if his father had permitted him, or had possessed the means of procuring for him the requisite instruction. His strength was hardly equal to the severe labour of the business to which he was actually bred; and at last, it is said, his exertions brought on a dangerous illness. It is admitted, that either this or some other cause gave him reason to apprehend that he would not be able to gain his bread by the trade he had learned. In these circumstances he scarcely knew what to do, and gave way to considerable despondency. But what seems a misfortune, and is felt as such at the time, is often fraught with results which more than compensate for the temporary pain or inconvenience it occasions. In the hospital to which he was taken, Messys amused himself, during his convalescence, by sketching different objects in pencil. A friend, to whom he one day showed these attempts, was struck with something in them which seemed to him to indicate a genius for such performances; and, flattered and excited by this commendation, Messys renewed his efforts, and persevered till he gradually acquired facility and superior skill. Another account, which however does not seem to be inconsistent with this, makes him to have given the first public evidence of his ability in his new art, by the fabrication of a number of little figures in imitation of the rude wooden images which used to be distributed among the people by the members of one of the hospitals in Antwerp, as they walked in their annual procession. The figures which Messys produced were at once acknowledged by all to be far superior to any they had been accustomed to see; and the demand for them furnished him with occupation for a short time. It was probably after this that he executed the iron-railing, or rather cage, over a well near the great church of Antwerp, which is still to be seen; and also an iron balustrade for the college of Louvain,—both works of great merit. But even these performances, exercises of ingenuity and fancy as they were, might still be considered as not altogether beyond the range of his original employment. He had not yet abandoned working in iron; and therefore there may be truth in the story which assigns a particular cause for his eventually becoming a painter. A mutual attachment, it is said, had grown up between the blacksmith and the daughter of a painter of Antwerp, who was resolved, however, to bestow her upon a young man of his own profession. Messys determined to make an effort to place himself on a level with his rival in the point which had regulated the father's preference; and the result was that he produced a picture, with which the father was so much struck, that he changed his intention, and made the lovers happy by at once consenting to their union. In allusion to this incident, some verses under a portrait of Messys, describe him as having been transformed by love from a Vulcan into an Apelles; but some writers have been disposed to contend that the verses in question, which were not written till about a century after the time of the painter, are probably the only foundation for the story. At the same time, it would seem difficult to account for the author of the verses having expressed himself in the manner he has done, had he not gone at least upon some tradition similar to that now mentioned.

Be the origin, however, of his devotion to art what it may, Messys became in time a very distinguished painter,—the most distinguished indeed which his country produced in that age. He painted numerous pictures, of the merits of some of which, several of the best critics, and among others Sir Joshua Reynolds, have spoken in terms of warm admiration. Sir Joshua says that in his greatest performance, the Descent from the Cross, there are heads that have not been excelled by Raphael. Messys never was in Italy, and it has been thought that his genius failed to develope itself in some respects as it might have done for want of this advantage. His manner is forcible, but somewhat hard and dry,—a defect which might possibly have been removed, had he enjoyed an opportunity of studying the works of his great Italian contemporaries, in which truth of nature is so finely combined with, and irradiated by, the spirit of poetry and beauty.

The picture of which our wood-cut is a copy has been always considered one of the most successful, as well as characteristic performances of this painter.

Messys is also said to have been the artist who wrought the iron-work of the tomb of Edward IV. in the choir of St. George's Chapel at Windsor. He appears in his own day to have been well known in England, and is spoken of with much admiration by Sir Thomas More in one of his Latin poems. He died in 1529, and left a son named John, who followed the same profession, but never attained the excellence or the reputation of his father.

THE EMIGRANTS.

Where the remote Bermudas ride
In the Ocean's bosom, unespyed,
From a small boat that rowed along,
The list'ning winds received their song:

"What should we do, but sing His praise
That led us, through the watery maze,
Unto an isle so long unknown,
And yet far kinder than our own!

Where He the huge sea-monsters racks,
That lift the deep upon their backs;
He lands us on a grassy stage,
Safe from the storms and prelates' rage*.

He gave us this eternal spring
Which here enamels every thing,
And sends the fowls to us, in care,
On daily visits through the air.

* The Emigrants whom the poet describes were dissenters from the Church of England, when the tolerant spirit of later times had not been called into action.

He hangs in shades the orange bright,
Like golden lamps in a green night,
And in these rocks for us did frame
A temple where to sound His name.
Oh! let our voice His praise exalt
Till it arrive at Heaven's vault,
Which then, perhaps, rebounding may
Echo beyond the Mexique Bay."
Thus sung they in the English boat
A holy and a cheerful note;
And all the way, to guide their chime,
With falling oars they kept the time.

ANDREW MARVELL. Died, 1678.

MANUAL ALPHABETS.

IN laying before our readers a representation of the manual alphabets, respectively in use in this country and on the Continent—which we think may be of practical use to some, and not without interest to many—it seems desirable to explain what they are, to state the purposes to which they are applicable, and to give an account of their origin so far as it can be ascertained. For the means of doing this we are considerably indebted to the memoir of the Abbé de l'Epée in the 'Biographie Contemporains,' and to an article on the subject in a recent number of the 'Magasin Pittoresque.'

The pretensions of the manual alphabets have been much misunderstood and frequently overstated. If we had not met with grave and eloquent essays, which give to dactylology (a name derived from the Greek, meaning finger-talking,) the power of conducting the dumb to the gradual attainment of speech, we should think it scarcely requisite to state that it is merely a substitute for, or rather, a mode of writing; with no other advantage over the use of pen, ink, and paper, that we are aware of, than this—that the apparatus is always at hand, always ready for use. By the means of the manual alphabet all the words and phrases of conversation can be expressed. To learn it requires less than half an hour, and the practice of a few days makes the use of it easy and expeditious. With the following engraving before him, no person can find difficulty in teaching himself.

In the one-hand alphabet the letters J and Z are figured in the air; J with the little finger, and Z with the index. In the other, the letter H is formed by dashing the palm of the right hand across that of the left. The other characters do not appear to need explanation. It is very unnecessary to mark the points otherwise than by a proper pause in the manual action. But it is requisite that the words should be separated, either by a very slight pause, by a horizontal motion of the hand from left to right, or by a sort of fillip with the finger and thumb of the right hand.

On comparing the two alphabets, we find that the object of both is to represent, as nearly as possible, the usual forms of the letters—the double-handed alphabet imitating the capitals, and the other the small letters. The single exhibits an anxiety not to require the help of the left hand; and the other is unwilling to dispense with its assistance. The single tortures the fingers, in order to screw them into some fancied resemblance to the written character; and we see that, after a lame attempt to form X with one hand, it admits another, formed with two, as a variety. The other often chooses to do with two hands what one would do better; so, to match with the X in the single alphabet, there is Q in this. A very good letter is formed with one hand, but a variety is introduced as if to show that it could be done with two. C and J remain the only letters which two hands could not be made to represent; and the former is the same in both alphabets. The highly anomalous and awkward variety of Z, seems to have been devised for no other reason than to obtain a resemblance to the written form. We are disposed to consider that, taking either one or both hands throughout, forms much more convenient and easy might be devised if the object of resemblance were altogether relinquished. But taking them as they stand, the characters made with two hands are much more distinct, and more easy to form and decypher than the other. There is also this advantage in the two-handed alphabet, that it presents the only conceivable mode of communicating with the deaf in the dark; for the characters being formed *by* one hand *upon* the other, it is only necessary with the right hand to form the letters upon the left of the person addressed. We are informed by Mr. Watson of the Kent Road Asylum, that the pupils in that institution, who have sufficient knowledge of language to use the manual alphabet at all, can, in this manner, converse with great facility by night.

Although the two-hand alphabet is much the best known in England, our information concerning the other is far more distinct. The latter certainly came from Spain, where also the art of instructing the deaf and dumb seems to have originated. The subjects are, indeed, so much connected, that it would be useless to attempt to keep the consideration of them entirely separate. It is a vulgar mistake to assign a French origin to those useful arts. The Abbé de l'Epée could well afford to spare the honour of the original discovery, if the assertion of an eloquent writer be true, that "He is not the first discoverer of any art who first says the thing; but he who says it so long, and so loud, and so clearly that he compels mankind to hear him*." Of the manual alphabets the Abbé certainly was not the inventor; and the impression that he was such may perhaps have arisen from the circumstance that his tomb-stone, in the cemetery of Père la Chaise at Paris bears the figure of an open hand.

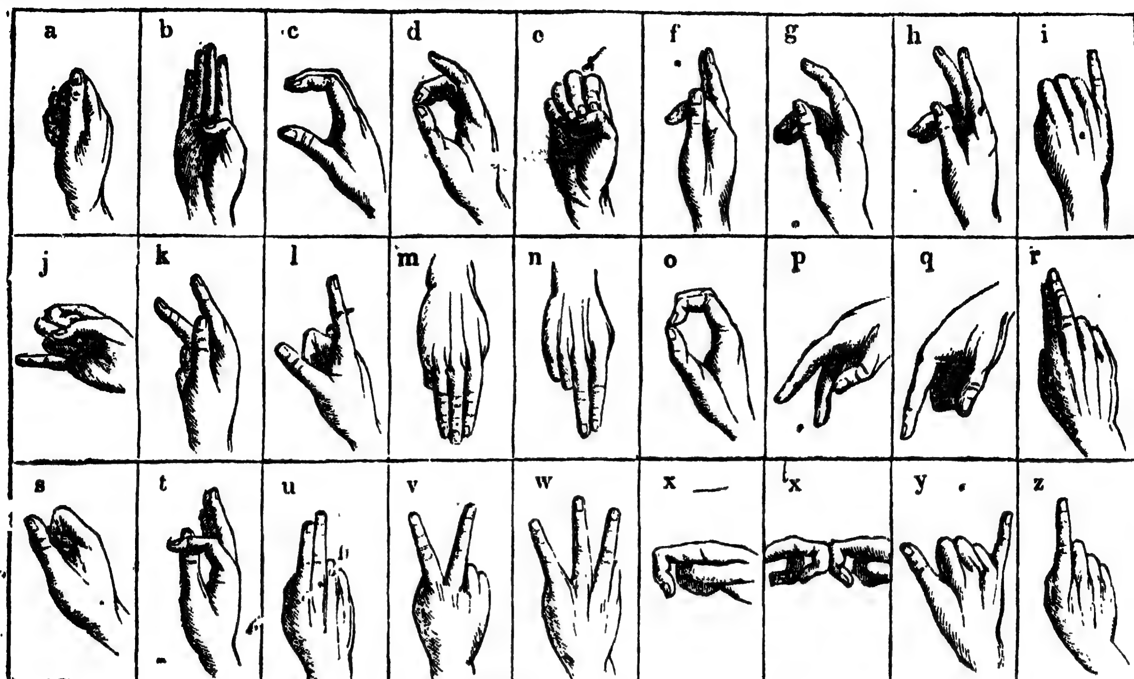
If it were not also ascertained that the art of instructing the deaf and dumb originated in Spain, our knowledge that manual alphabets were first known in that country might have led to the supposition that they were originally designed for the purposes of secret communication. But our better information allows us to assign to the invention a benevolent and useful object; as it is known that this mode of communication entered into the system by which the dumb were taught to speak.

Father Ponce, a Benedictine monk of the monastery of Oña in Spain, who died in 1584, appears to have been the first who exercised the art of instructing this unfortunate class of beings; but we are unacquainted with his method. Don Juan Paolo Bonnet published, in 1620, a book in which he developed the principles by which he had been guided in the education of the constable of Castille, who had become deaf at four years of age; but who, under Bonnet's instruction, learned to speak his native language with much distinctness. Bonnet was emulated—it is not clear we should say imitated—by Digby, Wallis and Burnett, in England; Ramirez of Cortono; Petro de Castro of Mantua; Conrad Amman, a Swiss physician practising in Holland; Van Helmont, and many others.

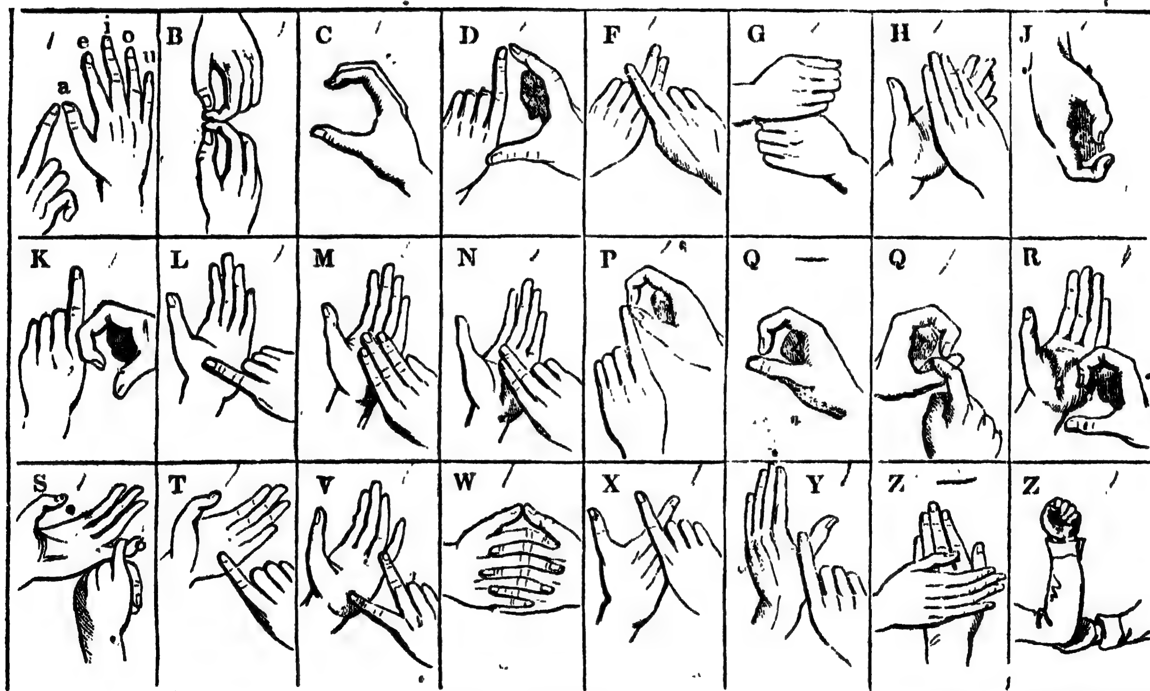
It appears strange that, notwithstanding this, the possibility of instructing the deaf and dumb seems to have been so little suspected in France, that Don Antonio Pareiros, who settled in Paris about the year 1735, was encouraged by the general ignorance to claim the honour of the discovery for himself. He made a great mystery of the means he employed; but his claim was allowed by the Academy of Sciences. Some years after, another professor of the art, one Ernaud, set up a rival claim, published a book, and solicited and obtained from the Academy the same honour which had

* Edinburgh Review.

been granted to Pareires. It seems that under all the systems of instruction previous to that of De l'Epée the pupils were considered to have attained perfection when they had been brought to pronounce with more or less facility, and, often with much pain and difficulty, a certain number of phrases; and, in obtaining this result, the finger-alphabet was much employed by the teachers of the Spanish school.



[The Single-handed Alphabet.]



[The Double-handed Alphabet.]

The one-handed alphabet seems to be particularly distinguished as the manual alphabet of the Spaniards. It is said to have been introduced into France by Pareires, and the Abbé de l'Epée is stated to have borrowed it from him, having only before known the two-handed alphabet. But another account, which, as the most authentic, we shall give, declares that the Abbé obtained a knowledge of the alphabet from a Spanish book.

On one of the days which the Abbé was in the habit of employing in the instruction of his pupils, a stranger came and offered to his acceptance a Spanish book, with the assurance that a knowledge of its contents would be of much service to him in his laudable undertaking. Being ignorant of the Spanish language, the Abbé at first declined the offered present; but having opened it at hazard, he perceived the manual alphabet of the Spaniards, and then, turning to the title-page, he read the words—*Arte para enseñar à hablar los mudos.* "I had no difficulty," says the Abbé, "in divining that this signified *the art of teaching the dumb to speak*; and from that moment I determined to learn the language, that I might be of service to my pupils."

From the schools of the Abbé the use of this alphabet extended to nearly all the institutions for the instruction of the deaf and dumb on the Continent, and in the

United States. The use of it is very limited in this country.

Among themselves, the instructed deaf and dumb use almost exclusively the language of *signs*, and have recourse to the manual alphabet only for the expression of proper names, or of such technical words as have not yet been characterised by a specific sign. But, in communicating with those who are unacquainted with their system of signs, they habitually use the alphabet. In conversing thus with them it is not always necessary to form entire phrases. The principal words suffice to fix the attention, and a natural gesture completes the thought. Yet it must be admitted that, in the endeavour to catch ideas which are only partially expressed, they are often exposed to very curious and sometimes very provoking mistakes.

As all the deaf and dumb who have received the usual instruction are acquainted with the use of the manual alphabet, it seems almost incumbent on those who have any intercourse with such, or with others who cannot benefit by vocal communication, to acquire this useful and simple art.

MINERAL KINGDOM.—SECTION 21.

COAL.

THE annual consumption of coals in Great Britain must be enormous; but there are no means of ascertaining the amount with anything approaching to accuracy, because no account, accessible to the public, is kept of by far the largest amount consumed. By the duties levied on coals carried coastwise, and by the returns to parliament laid before special committees, we obtain some correct data; but the amount stated in these is but a small part of the coal raised throughout Great Britain. In the evidence before the committees of the Lords and Commons, in 1829 and 1830, we have some calculations by two eminent civil engineers, Mr. Buddle and Mr. Taylor. Mr. Buddle says, "The calculation which I have made of the consumption of England and Wales is as follows: manufactories, 3,500,000 London chaldrons; household consumption, 5,500,000, making 9,000,000 in all, consumed from inland collieries: the quantity sent coastwise, on both sides of the island, is 3,000,000; together 12,000,000 chaldrons." As a London chaldron is nearly 27 cwt., that quantity is equal to about 16,200,000 tons weight.

Mr. Taylor's estimate of the consumption of coal in Great Britain is given in the following form:—

	Tons.
The annual sale of coals carried coastwise from Durham and Northumberland, is	3,300,000
Home consumption, say one-fifth	660,000
Total	3,960,000
Which quantity supplies about 5,000,000 persons; and, supposing the whole population of Great Britain to be 15,000,000, this must be trebled	11,880,000
Consumed by iron-works, say 600,000 tons of metal, to produce which requires at least four times the quantity of coal in making even pig-metal; and the extraordinary consumption in the mines of Cornwall, &c.	3,000,000
Consumed in Great Britain	18,840,000
Exported to Ireland, say	700,000
Total tons, exclusive of Foreign Exportation	19,540,000

Thus Mr. Buddle gives a larger amount for the consumption of England and Wales alone than Mr. Taylor does for the whole of Great Britain, and including a part of the consumption of Ireland.

The export of coals from the Tyne and the Wear amounted, in 1828, to about 3,200,000 tons, and the consumption on the spot to about 660,000 tons. Thus the total annual sale of coals from the Newcastle and Durham coal-fields is probably not much under four millions of tons.

So vast a consumption leads naturally to the inquiry, "what, at this rate of annual excavation, will be the probable duration of this coal-field?" This question occupied a great deal of the attention of the Committees of both Houses of Parliament, already spoken of, and there was a very wide difference in the answers which they received. Mr. Taylor was asked by the Lords' Committee if he had formed any calculation of the extent, produce, and duration of the Durham and Northumberland coal-fields; and he replied, that he had endeavoured to do so, and gave in the following statement; which he said, however, was only to be considered as an approximation.

	sq. miles.
He estimates the Durham coal-field, south of the Tyne, to embrace an area of	594
The Northumberland Field	243
	837
And he considers that of this there had been excavated	105
Leaving, in 1829	732

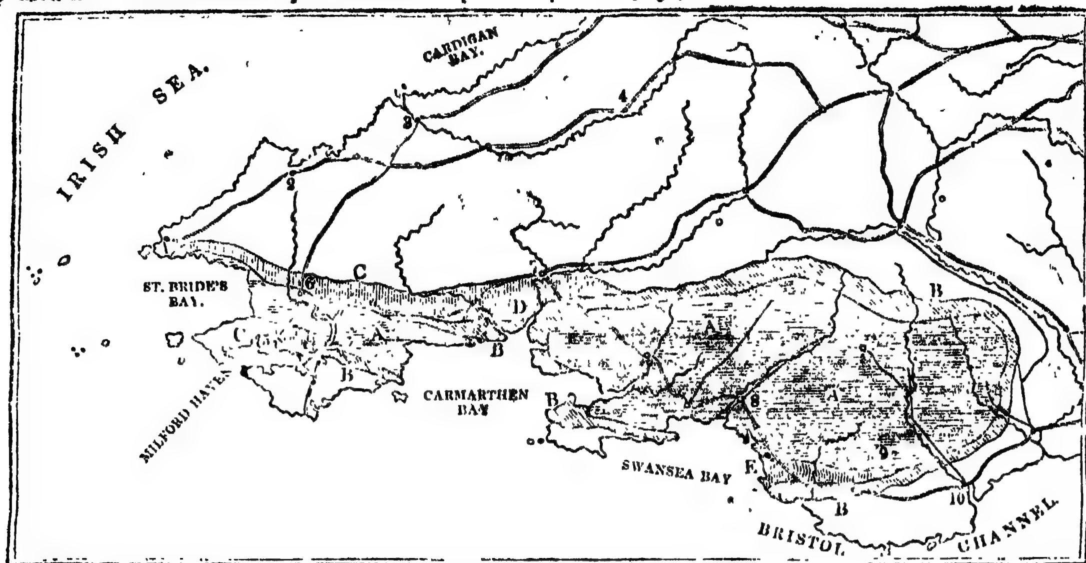
	Tons.
Then estimating the workable coal strata at an average thickness of 12 feet, the contents of one square mile will be 12,390,000 tons, and of 732 square miles	9,069,480,000
And deducting one-third part for loss in working, and from disturbances in the strata	3,073,160,000
There remain	6,046,320,000

This very comfortable and consolatory view of our own condition, and of that of our distant posterity, as regards this valuable commodity, is, however, a good deal disturbed by the opinions of Dr. Buckland and Mr. Sedgwick, the professors of geology at Oxford and Cambridge. Dr. Buckland being asked whether he considered the estimate of Mr. Taylor correct, answered that he thought it much exaggerated. Mr. Sedgwick is also of opinion that Mr. Taylor's estimate is too great; and both professors state the same reasons for differing so widely from the views of Mr. Taylor. He has assumed that there is a continuous thickness of twelve feet of workable coal over the whole area of 732 square miles; but all experience, both of this coal-field and of every other, is unfavourable to this assumption, for not only are the coal-seams extremely variable in thickness, but they are equally so in quality, as we have already shown. The opinions of the learned professors are confirmed by another scientific observer, Mr. Bakewell, who, in his 'Introduction to Geology,' discusses this question, and calculates that the coal-field now under consideration will not last above 360 years. All these calculations, however, have reference only to the best qualities of coal,—to those which can be raised at an expense sufficiently low to enable them to be sold at a remunerating price, in competition with other coals.

It appears to be very clearly made out that all those parts of the country which are now supplied with fuel from the Northumberland and Durham mines will continue to enjoy that advantage for the next 400 years; and those who are not so selfish and unpatriotic as to be indifferent to the fate of their posterity after the year 2233, will learn with satisfaction that as far as England's prosperity is connected with an abundant supply of coal, there is no danger of its sustaining any check for a much more extended period, as there is a store in reserve far greater than there was in the whole of the north of England field before a single fire was lighted by its produce. This extensive repository is in the coal-field of South Wales.

The geographical position of this vast deposit of the coal-measures will be seen by the annexed Map. It lies in a great basin of the carboniferous limestone (O. diagram in No. 51, 19th January), which rises from under the coal strata nearly all around the limit of the coal-field. In a part of Pembrokeshire, the limestone is wanting, and the coal strata rest upon slate (Q) which is inferior to the limestone, and, near Narbeth, they are in contact with the old red sandstone (P) which lies between

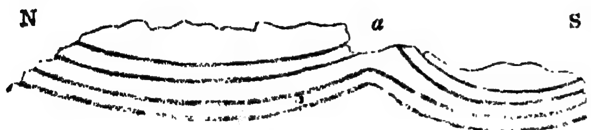
the slate and the limestone. In a part of the southern boundary in Glamorganshire, the coal-measures are separated from the limestone by a detached deposit of strata of posterior formation to them, and therefore lying upon them, viz., new red sandstone (K), and lias limestone (I. *f.*).



A, A A. The coal-field, tinted with horizontal lines
B, B, B, B. Limestone, tinted with lines sloping to the right.
C, C. Slate, tinted with perpendicular lines.
D. Old red sandstone, tinted with dotted lines.
E. New red sandstone, tinted with perpendicular waving lines.

1. St. David's. 2 Fisgard. | 3. Cardigan. 4. Lanbodr. | 5. Milford. 6. Haverfordwest. | 7. Carmarthen. 8. Neath. | 9. Llantrissent. 10. Cardiff.

The coal-measures do not lie horizontally within this limestone basin, but in a trough shape, being deepest towards the middle, and rising up towards the outer limits, the ends of the several strata *cropping out*, as the miners term it, that is, appearing successively at the surface. They do not, however, form one uniform sweep or inverted arch; for there has been a partial upheaving of the strata, so that a section across the field from Bridgend, due north, would present the following appearance:—



There are thus two basins, the one lying to the north, the other to the south of a high ridge *a*, which runs from Aberavon, half a mile north of the Avon, by Cefn Eglwysillan, two or three miles north of Caerphilly, a little beyond which it disappears. In the northern basin, which is by far the most extensive, the strata are much less inclined than in the southern basin; for in the former the dip of the strata is generally under 10°, while in the latter it is often 45° and upwards. The whole coal-field is traversed by *dikes* or *faults*, generally in a north and south direction, which throw all the strata from 300 to 600 feet up or down. The nature of these faults we have explained in Section 16. On the western termination of the basin, in St. Bride's Bay, the strata exhibit the most extraordinary marks of confusion and derangement, being vertical and twisted in every possible direction.

The extent of this coal-field, and the thickness of the seams, have been variously stated by different authors; but the estimate which is perhaps the most to be relied upon, is that of the Rev. William Conybeare, the eminent geologist, who has long resided in the country, and is perfectly familiar with its geology. It is contained in a letter addressed by him to Henry Warburton, Esq., M.P. published in the Report of the Committee of the House of Commons, already often referred to. Mr. Conybeare makes three great divisions of the coal-seams; the lower, middle, and upper series, and he assigns to them, respectively, the average thickness of thirty-five, fifteen, and ten feet, making altogether sixty feet of workable coal. Martin, who described this coal-field, makes them amount to ninety-five feet; and Mr. Conybeare thinks that Martin does not overstate the amount, provided all the seams be taken into the account. But Mr. Conybeare's calculation only includes the workable coals, and he considers that those seams cannot be worked with profit where it is necessary to go lower than 200 fathoms, or 1200 feet, for beyond this the expense of drainage, &c., becomes enormous. Keeping the same considerations in view, Mr. Conybeare makes the following estimate of the area occupied by the coal seams:—

For the Lower Series,	525	square miles, at	35	feet thick.
,,	160	,,	17	,,
Middle Series,	360	,,	16	,,
Upper Series,	61	,,	10	,,

This, it is calculated, after deducting one half for loss and for what has been already worked, will amount to about 11,123,750 000 tons; and taking the annual consumption of all England at 15,000,000 of tons, the provision of good coal in the South Wales Basin is sufficient for 760 years. Taking all that remains in the Northumberland and Durham coal-fields, and all the other coal fields of England together at three times that amount, and which we are inclined to think would not be an over-estimate, we have a supply of good coal, which, at the present rate of consumption, would last above 3000 years: how long beyond that time the inferior seams will yield a supply of fuel, we shall leave posterity to calculate.

We have hitherto spoken only of the coal-fields of England, and have taken no notice of the large deposits which exist in Scotland. These, although very productive, are confined to a very limited space. Nearly all the valuable mines are in the Low Country, between the Highlands on the north and the range of slate mountains which run in a north-east and south-west direction across the island, in the south of Scotland. The capital is very abundantly supplied with excellent qualities of coal brought from a distance of only a few miles, and delivered in Edinburgh at from nine to twelve

shillings per ton. Glasgow is surrounded with collieries, and is supplied at even a cheaper rate than the capital; and to this profusion of fuel not only Glasgow but Paisley, and the neighbouring great manufacturing towns owe, in a great degree, their origin and prosperity. The mines in the counties of Fife and Clackmannan also produce very fine qualities of coal.

The coal formation of Scotland is found in the county of Antrim, on the opposite coast of Ireland, and the two were probably at one time continuous, for there are not only indications of the coal-measures in the intermediate islands, but there are many other circumstances connected with the geology of the two countries, which almost amount to decisive proof that Ireland and Scotland were at one time united. The collieries of Ballycastle, on the north coast of Antrim, were formerly considerable, sending from ten to fifteen thousand tons to market yearly; but they are now greatly fallen off. A very extraordinary discovery was made at these collieries about the year 1770: the miners unexpectedly discovered a passage cut through the rock, which was very narrow, owing to incrustations formed on its sides; but, on being sufficiently widened, some workmen went through it, and found that it led to a gallery which had been driven forward many hundred yards into the bed of coal. It branched out into thirty-six chambers, where the coal had been worked out in a regular manner, pillars being left at proper intervals to support the roof. Some remains of the tools, and even of the baskets, used in the works were discovered, but in such a decayed state that, on being touched, they fell to pieces. There does not exist the most remote tradition of such a work in the country; and its great antiquity is proved by the sparry incrustations on the sides and pillars of the mine, for, in such a situation, a very long period would probably elapse before these would be deposited. (See 'Hamilton's Letters on Antrim.') In the eastern part of the county of Tyrone, at Coal Island and Dungannon, a coal-formation occurs associated with that variety of limestone which is usually found underlying or alternating with the coal-measures in Scotland and England.

But coal has been discovered in greater or less quantity in seventeen counties of Ireland. The coal district of the province of Munster, according to Mr. Richard Griffith, an experienced geologist and practical engineer, is greater in extent than any in England, and probably contains, he says, almost inexhaustible beds of coal. It extends over a part of the county of Clare, over a considerable portion of the counties of Limerick and Kerry, and a large part of the county of Cork. But none of the coal-beds of this province, with the exception of those in the county of Clare, belong to the same geological period as the coal-fields of England and Scotland: in place of lying above the carboniferous limestone (O. diagram in No. 51, 19th of January), they lie under it, and are interstratified with the old slate rocks (A), the lowest in the whole series of the secondary strata. The quality of the coal too is quite different from either the English or Scotch coal, being that variety called anthracite, which burns without flame, and approaches to the nature of charcoal. It is chiefly used for burning the limestone of the adjoining districts; and the most considerable collieries, those of Dromagh, have yielded 25,000 tons per annum, at from ten to fifteen shillings per ton. The district of Clare belongs to the true coal-measures (M), but they are chiefly the shales, sandstones and sandy slates, coal being of very rare occurrence, as far as discoveries have yet been made, and when found, it is of very indifferent quality. Mr. Griffith is of opinion that coal of a bituminous quality is very extensively distributed over the eastern part of the province of Connaught, particularly in the counties of Leitrim and Roscommon; but little is as yet known with respect to the number and thickness of the seams, or the facility of working them. In the province of Ulster, besides the collieries in the counties of Antrim and Tyrone already mentioned, coal has been met with in the counties of Fermanagh, Monaghan, and Cavan, but not to any great extent. The province of Leinster contains the true coal-measures, lying above the carboniferous limestone, in the county of Carlow, and in Queen's county, and in the county of Kilkenny, from whence it stretches some way into the county of Tipperary. The great deposits are around Castlecomer in Kilkenny, and Killenaule in Tipperary, and both these have been extensively worked; but according to Mr. Weaver, in his account of the Killenaule district, the coal, not only of that field, but that of the other portions of the Leinster coal tract, is wholly of the nature of anthracite, and of a thin stratified structure.

Coal is found in many parts of the continent of Europe. One of the most considerable deposits is that of Belgium, where, in the province of Liege, the coal-formation extends from Thon near Namur to the confines of the province of Limburg, along the Meuse for thirty-three miles, and with a breadth of about eight miles. Continuing in a north-east direction from Liege, we find another coal-field between Aix-la-Chapelle and Dusseldorf, the principal collieries being in the neighbourhood of Eschweiler. The coal is of excellent quality, and is extensively worked. Farther on, in the same direction, we come upon a very extensive coal-field in the valley of the river Ruhr in Westphalia. It is above thirty five miles in length and seventeen in breadth, and the measures contain above one hundred and sixty different seams of coal, varying in thickness from six inches to seven feet, of which about eighty are worked.

Coal has been found in many other parts of Germany, particularly in Saxony, Bohemia, and Upper Silesia; and in those places it is almost invariably surrounded by manufactories. It has been found in more than thirty departments of France, but has been comparatively little worked. Coal is also abundant in the United States of North America. On the eastern side of the Appalachian system of mountains, the coal-formations are found only in the northern States; but, on the western slope, there is every reason to suppose that it exists over the greater part of the country between the Central Mountains and the Mississippi. The most celebrated mines at present worked are those near Pittsburg, in Pennsylvania.

THE ICHNEUMON.

The animal, which forms the subject of this article, was held in high respect by the ancient Egyptians, to whom it appeared to represent a benevolent power incessantly employed in the destruction of the reptiles, always annoying and often dangerous, with which warm and humid climates abound. To the destruction of such animals, the ichneumon seems incited by his instincts and destined by his means; but it is not by actual attack, but by the destruction of their eggs, that he represses the numbers of such creatures as the crocodile, the larger serpents, and the great lizard. The ichneumon, from its smallness, has not even the power to overcome his enemy the tupiramhis, an animal of habits very similar to his own; he is, moreover, not a very carnivorous animal, and his great timidity prevents him from capturing any animal capable of opposing a positive resistance. Impelled by necessity, and directed by much prudence, he is seen towards evening to glide between the inequalities of the ground, watching the least appearance, and fixing his attention on whatever strikes his senses, with the view of reconnoitering any danger, or of discovering prey; but where there is the least appearance of hazard he will neglect the calls of appetite

Besides eggs, the food of the ichneumon is chiefly

rats, small serpents, and birds. During the inundation he approaches the villages and devastates the poultry-yards; but being thus brought into contact with the fox and the jackall, he often becomes their prey. Like the pole-cat, he destroys all in the poultry-yard to which he gains access, or all the young which he can surprise at a distance from their mothers. But above all other food he searches for eggs, of which he is very fond, and it is thus that the ichneumon is so fatal an enemy to the crocodile; for it is no more true that he introduces himself into the mouth of that animal when asleep, than that he attacks it when awake.

The ichneumon exercises much perseverance in obtaining his prey. He is seen to remain for hours in the same place, watching for the animal he has seen there, and which he endeavours to obtain. This quality makes him a valuable substitute for the cat, in cleaning a house of the parasitical little animals that infest it, and he is for this reason domesticated. He is much attached, in a domestic state, to the house he inhabits, and remains affectionate and submissive to those who have brought him up. He does not ramble, and has no temptation to return to his wild state; but, when lost, he seeks the persons he has often seen, whose voices he recognizes, and whose caresses he loves. But this gentle creature loses much of his mildness when he eats. He then seeks out some secret retreat and manifests great choler if he sees any cause to fear being deprived of his prey. When he penetrates to a place which is unknown to him, he immediately explores it in every part, chiefly by his sense of smell, which of all his organs seems the most active and delicate, on which he appears to rely the most, and which seems in some measure to compensate for the feebleness of the others; for his sight, his taste, and his feeling do not present anything remarkable, only his external ear has a great breadth and extent of orifice.

The ichneumon is of a brown colour, speckled with dirty white,—that is to say, that each hair has brown and white rings. The hairs are very short and the rings very small upon the head and the extremity of the members, which gives to these parts a deeper tint than the others. The white rings are larger, and the hairs are longer upon the back and the tail. Upon the flanks and under the belly the hairs become still longer, and the tint is paler than on the other parts. The tail is terminated by a tuft of very long black hairs, which contrast strongly with the fawn-brown of the rest of the body. The hair of the ichneumon is more thick, dry, and weak than in any other animal of the same genera. The length of the body, from the ears to the root of the tail, is one foot; the length of the head, from the back of the ears to the muzzle, is about three inches and a half; the length of the tail is one foot four inches; and the height of the most elevated part of the back is seven inches.

Naturalists have been long acquainted with the ichneumon, but rather by character than figure. Figures were given by Belon, Gesner, Aldrovande and others, but they did not sufficiently distinguish the ichneumon from other animals of the same genera. Even Buffon mistook the Mangouste for it, to which he has applied all the descriptions concerning the ichneumon.

This animal has not yet a well-determined name in the methodical catalogues, different naturalists continuing to call it by different names. The name ichneumon, which is Greek, was first employed by Herodotus, and is indicative of the habits of the animal.



[Ichneumons.]

*** The Office of the Society for the Diffusion of Useful Knowledge is at 59, Lincoln's-Inn Fields.

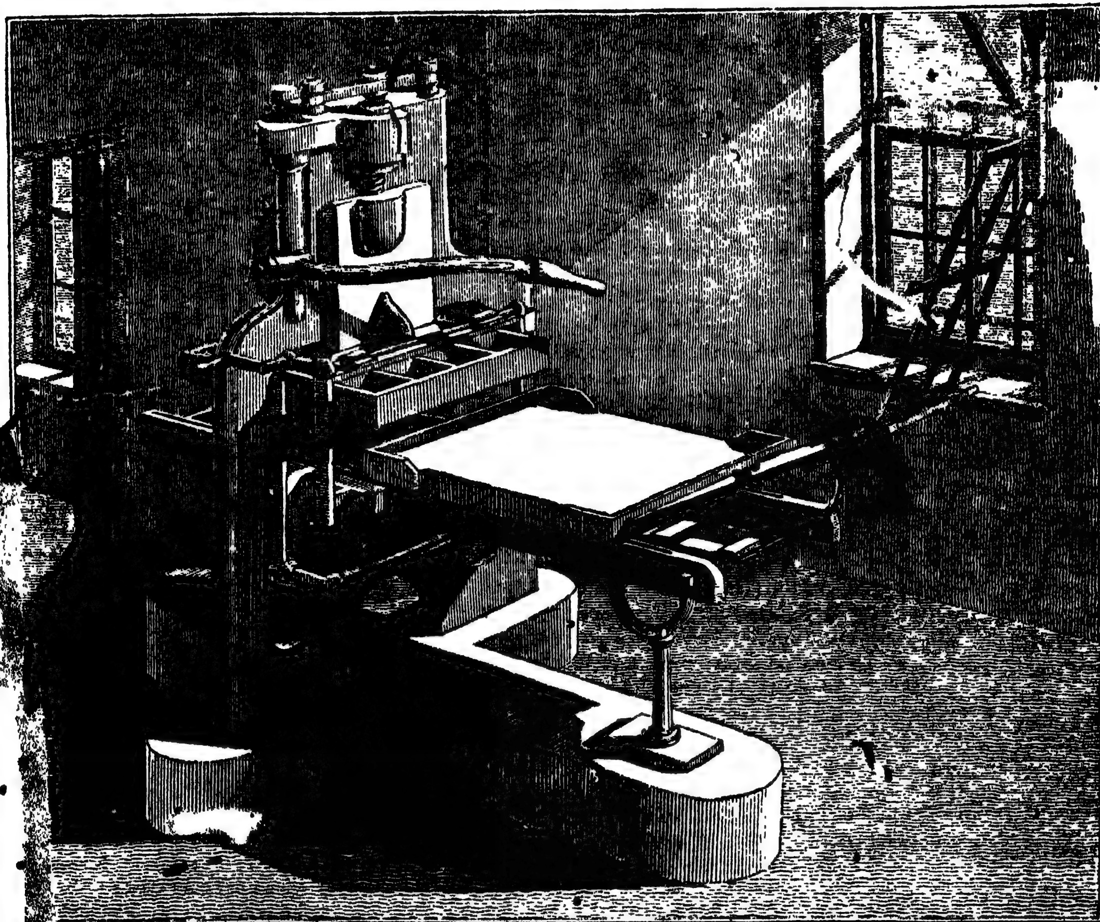
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THE COMMERCIAL HISTORY OF A PENNY MAGAZINE.—No.
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PRINTING PRESSES AND MACHINERY.—BOOKBINDING.



[The Stanhope Press.]

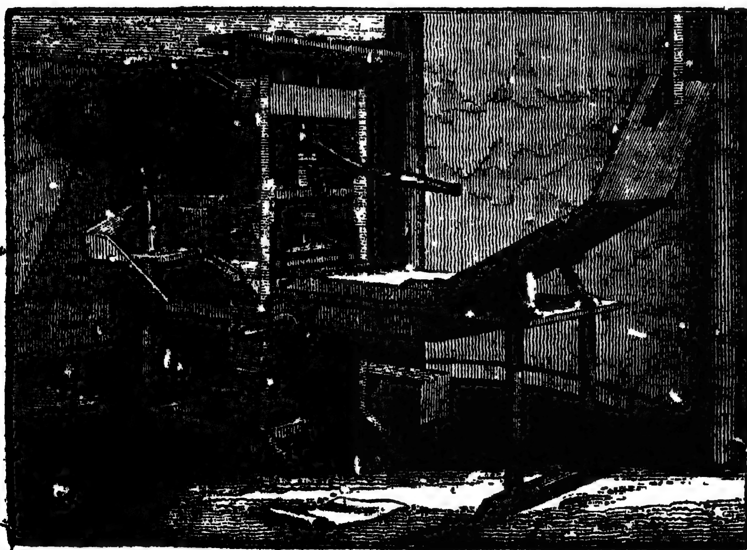
who have examined the early history of printing rcely have failed to see how the ordinary laws of and supply have regulated the progress of this se productions might, at first sight, appear to exception to other productions required by the ies of mankind. There can be little doubt, we at when several ingenious men were, at the ment, applying their skill to the discovery or of a rapid mode of multiplying copies of ere was a demand for books which could not upplied by the existing process of writing. nd had doubtless been created by the anxiety themselves, which had sprung up amongst Catholic Europe. There was a very general mongst the wealthier classes to obtain a know- the principles of their religion from the fountain- he Bible. The desire could not be gratified an enormous cost. Printing was at last dis- and Bibles were produced without limitation r. The instant, therefore, that the demand for uld be supplied, the supply acted upon the demand, by increasing it in every direction; and when it was found that not only Bibles but many other books of real value, such as copies of the ancient classics, could be produced with a facility [illegible] to the wants of every purchaser, books at once [illegible] a large branch of commerce, and the presses of the first printers never lacked employment. The purchasers of books, however, in the fifteenth and sixteenth centuries, were almost wholly confined to the class of nobles, and those of the richer citizens and scholars by profession. It was a very long time before the influence of the press had produced any direct effect upon the habits of the great mass of the people. In our own country, the many hundreds of pamphlets of political and religious controversy that were issued during the times of the civil wars, were unknown to the larger portion of those who took sides in the quarrel. They were directed to the important body of landed proprietors, and the no less important leaders of the people in towns; and they were formed to influence, as they were in great part produced by, the active spirits, whether of the church, the bar, of the senate,

ere the most prominent directors of public opinion. s not till the system of periodical literature was established, and that newspapers first, and ma- es and reviews subsequently, had taken hold of the lar mind, that the productions of the press could be to be in demand amongst the people generally. Up r own times that demand has been limited to very w bounds; and the circumstances by which it has extended are as remarkable as those which ac- nied the progress of the original invention of The same principle of demand going before and the same re-action of supply upon demand, be found to have marked the operations of the print- press in this country, during the last five and twenty rs, as distinctly as they marked them throughout rope in the latter part of the fifteenth century and beginning of the sixteenth. We will shortly re- pitulate these circumstances.

years after the commencement of the present a system of education, which is now known hout Europe as that of *mutual instruction*, was uced into this country. In whatever mode this n was called into action, its first experiments soon nstrated that, through it, education might be owed at a much cheaper rate than had ever before considered practicable. This success encouraged friends of education to exertions quite unexampled; d the British and Foreign School Society, and the tional Society, had, in a very few years, taught some housands of children to read and write, who, without he new arrangements which had been brought into ractice, would in great part have remained completely ntaught. A demand for books of a new class was thus reparing on every side. The demand would not be ery sudden or very urgent; but it would still exist, and ould become stronger and stronger till a supply was some degree provided for it. It would act, too, indi- ctly but surely upon that portion of society whose emand for knowledge had already been in part supplied. he principle of educating the humblest in the scale of ciety would necessarily give an impulse to the educa- on of the class immediately above them. The impulse ould indeed be least felt by the large establishments for ucation at the other end of the scale; and thus, whilst e children of the peasant and the tradesman would arn many valuable lessons through the influence of a sire for knowledge for its own sake, and of love for eir instructors, the boys of many of our great public hools would long remain acquiring only a knowledge words and not of things, and influenced chiefly by a grading fear of brutal punishment. The demand for knowledge thus created, and daily gathering strength amongst the bulk of the people, could not be adequately supplied twenty years ago by the mechanical inventions then employed in the art of printing. Exactly in the same way as the demand for knowledge which began to agitate men's minds, about the middle of the fifteenth century, produced the invention of printing, so the great extension of the demand in England, at the beginning of the nineteenth century, produced those mechanical improvements which have created a new æra in the typographical art.

In the 'Ancient view of a Dutch Printing-office,' given at the head of the 'Penny Magazine,' No. 107, the most rudely constructed of the early printing-presses is there shown. It will be seen that this instrument is nothing more than a common screw-press,—such as a cheese-press or a napkin-press,—with a contrivance for running the *form* of types under the screw after the *form* is inked. It is evident that this mode of obtaining an impression must have been very laborious and very slow. As the screw must have come down upon the types with a dead pull,—that is, as the table upon which the types were placed was solid and unyielding,—great care must have been required to prevent the pressure being so hard as to injure the face of the letters. These defects were at last remedied by an ingenious Dutch mechanic, Willem Jansen Blaew, who carried on the business of a mathe- matical-instrument maker at Amsterdam; in which business he had received instruction and encouragement from the great Danish astronomer, Tycho Brahe. The improvements in Blaew's presses do not require to be particularly described. It may be sufficient to mention that the head of the press in which the screw work l, as well as the bed upon which the table containing *form* of types rested, were yielding; and that the s consisted of three or four worms, according to the of the cylinder. In this way the pressure was ra communicated from the screw to the types; and spring above and below gave a sharpness to the im sion, while it prevented it being too hard. Bl presses gradually drove out the more ancient p but even as recently as the year 1770, Luckomb his 'History of Printing' then published, says, "T are two sorts of presses in use, the old and t fashioned; the old sort till of late years were t presses used in England." We subjoin a represe of Blaew's "new-fashioned" with which beginning of the present c tu, all the prin Europe was performed.

The stereotype improvements of Lord St which we have already described, and the printi



[The Common Printing Press.]

invented by that nobleman, which bears his name, offered the first great practical improvements in the art of printing, with the exception of Blaew's press, that had been called into operation during a period of 350 years. The Stanhope press is represented in the woodcut at the head of this number. It is unnecessary for us minutely to describe this very ingenious instrument. It is as superior to Blaew's wooden press as that was the rude press that preceded it. Being composed of iron, the surfaces brought into contact impression is given are perfectly level; and combination of levers which give motion to the diminish the labour of the workman, while they to its efficiency. This invention undoubtedly end printing of a better average quality to be produced; it added very slightly to the speed with which impressions could be thrown off. Both at the Stanhope ss and at the wooden press the same general rate work was maintained, namely, 250 impressions on side of a sheet per hour, to be produced by the labour ... men, one inking the types, the other ... on th... nd giving the pressure.

...le the ... cal power of the printing-press had ... y years pretty much the same as ... tion of the art, the mode in which ... the types had been quite un... uries and a half. In the 'View ... ffice' it will be seen that the man putting the ink on the types with one of which he holds in each ... s, technically called *balls*, were ... nting twenty years ago. As the ... pected to make his own loom, so, years, the division of labour was so ... printing that the pressman was ... s own balls. A very rude and ... s. The sheepskins, called pelts, ... printing-office, where the wool ... stuffed was also carded; and ... factured by a man whose general ... a different nature, required the ... least half an hour's labour every day ... reeable operation, by which they were ... quantity of ink wasted by these balls ... much so, that we have heard an ... ke many other unthinking people, ... aste of an article is an encourage... lament that if he sold more ink in ... tended demand for ink created by ... his trade was to the same extent ... nution of the waste that attended the ... printing-press. The printer's balls ... eded, and their waste of material ... by an invention applicable not only ... machinery, but printing by hand.

... the state of the press department of printing, ... England, but throughout the world, till the ... As several approaches had been made before ... Faust to the principle of printing books from ... pes, so the principle of producing impressions ... der, and of inking the types by a roller, which ... t principles of the printing machine, had ... red in this country as early as the year 1790. ... Mr. William Nicholson took out a patent ... provements in printing, the specification of ... shows that to him belongs the first sug... ting from cylinders. But this inventor, ... was led astray by a part ... ly difficult, if not im... hat portion of his plan ... rought into the most ... tent was never acted ... machine was Mr. ... first sheet of paper printed by cylinders, and by steam, was the 'Times' newspaper of the 28th November, 1814. The machine thus for the first time brought into action, was that of Mr. Koenig.

Before we proceed to a description of the printing machine, or take a view of its general effects upon the diffusion of knowledge, let us imagine a state of things in which the demand for works of large numbers should have gone on increasing, while the mechanical means of supplying that demand had remained stationary—had remained as they were at the beginning of the present century. Before the invention of stereotyping it ... necessary to print off considerable impressions of the books in general demand, such as bibles and prayer books, that the cost of composition might be so far divided as to allow the book to be sold cheap: with several school-books, also, it was not uncommon to go to press with an edition of 10,000 copies. Two men, working eight hours a-day each, would produce 1000 perfect impressions (impressions on each side) of a sheet per day; and thus if a book consisted of twenty sheets, (the size of an ordinary school-book,) one press would produce the twenty sheets in 200 days. If a printer, therefore, were engaged in the production of such a school-book, who could only devote one press to the operation, it would require very nearly three-quarters of a year to com... 10,000 copies of that work. It is thus evident, th... if the work were to be published on a given day, it must begin to be printed at least three-quarters of a year before it could be published; and that there must be a considerable outlay of capital in paper and in printing for a long time before any return could be expected. This advance of capital would have a necessary influence on the price of the book, in addition to the difference of the cost of working by hand as compared with working by machinery; and there probably the inconvenience of the tedious progress we have described would stop.

But take a case which would allow no time for this long preparation. Take a daily newspaper, for instance, of which great part of the news must be collected, and written, and printed within twenty-four hours. Before the application of machinery to the printing of newspapers, in 1814, there were as many daily London newspapers as at present; but their average size was much smaller than those now published. The number of each paper printed was less than at present; and the later news was much more incompletely given. The mechanical difficulties of printing a large number within a limited time required to be overcome by arrangements which involved considerable expense; and thus less capital was left to be expended upon that branch of the outlay by which the excellence of a newspaper is mainly determined,—namely, the novelty, the completeness, and the accuracy of its intelligence. Let us take, for example, the 'Times' newspaper for some years prior to 1814, when it began to be printed by machinery. When that paper was originally established, somewhere about forty years ago, the present system of reporting speeches in parliament on the same night that they were spoken was scarcely ever attempted. A few lines mentioning the subject of the debate, and the names of the principal speakers, were sometimes given; but anything like a sketch of the general debate, or a report of any remarkable speech, was deferred to a future day, if it were published at all. Mr. William Woodfall, the son of the celebrated printer of the 'Public Advertiser,' in which the letters of Junius first appeared, undertook, without any assistance, the arduous task of reporting the debates of both Houses of Parliament, day by day, in his father's paper, and afterwards in other daily journals. This person possessed a most extraordinary memory, as well as wonderful powers of literary labour. It is asserted that he has been known to sit through a long

the House of Commons, not making a single note of the proceedings, and afterwards to write out a full and faithful account of what had taken place, extending to sixteen columns, without allowing himself an interval of rest*. The remarkable exertions of this most famous of reporters gave the newspapers for which he wrote a celebrity which compelled other newspapers to aim at the same fullness and freshness in their parliamentary reports. What Woodfall accomplished by excessive bodily and mental exertion, his contemporaries succeeded in bringing to a higher degree of perfection by the division of labour; and thus in time each morning newspaper had secured the assistance of an efficient body of reporters, each of whom might in turn take notes of a debate, and commit a portion of it to the press several hours before the whole debate was concluded. Perfect as these arrangements had become at the beginning of the present century, it is manifest that during the session of Parliament at least, when newspapers are most interesting, their circulation must have been necessarily limited by the mechanical difficulties of their production. We must explain this a little more in detail. 'A newspaper, being made up of many distinct articles, does not require, as a book does, that the whole of the types of which it is composed should be set up before one side ... is printed off. The outer side of a daily paper, ... ordinarily consists of advertisements, communications, and paragraphs of minor importance, may be printed off some hours before the inner side, which contains the later news, is ready to be printed. Such an arrangement of course would prevent the whole paper being filled with the latest news, as is now frequently the case; and thus all the papers printed before the invention of the machine will be found to be constructed with reference to this principle of having one half printed long before the other half was ready to be printed. But let us see how that half, which contained the last intelligence, was brought out previously to 1814. If we refer to such a paper containing a report of any great parliamentary debate, we shall find the speeches generally given of a length not proportioned to their importance, but to the time of the evening in which they were delivered. Those reporters to whose share the earliest speeches fell gave them fully, because there was time for printing them; and this fullness left little space for the more important speeches which at that period generally closed the debate. The quality of reporting was therefore injured by the brevity required for all speeches delivered after midnight. Without this sacrifice the paper could not have been published at all on the day whose date it bore; and even with this sacrifice the difficulty of meeting the demand was excessive. The only mode in which it could be met was by setting up a portion of the paper in duplicate,—that is, setting up two sets of types, so that two presses might be engaged in printing it off at the same time. Sometimes in large papers, such as the 'Times,' a page only was worked at one press, to enable the pressmen to proceed with great speed. If the House of Commons now sits to four o'clock, and the 'Times,' or the 'Chronicle,' or the 'Herald,' cannot be ready for printing off till six o'clock at the earliest, the papers are nevertheless published, so that the country and the town may be supplied without intermission. In such a case, before the introduction of the printing machine, the morning coaches would have departed without a paper, and the people of London would have received them at the hour of dinner instead of that of breakfast. The printing press, as we have mentioned, will, at the ordinary rate, enable two men to take off two hundred and fifty impressions in an hour. By the most violent exertions the pressmen of a daily newspaper were enabled, with relays, to work off about five hundred copies in an hour. One press would therefore produce ten thousand copies in about twenty hours. It is manifest that such a rate of speed, if such a quantity were demanded, would be incompatible with the production of a daily paper, the condition of whose existence is that it must be wholly printed and issued in four and twenty hours. Let us double the speed by printing in duplicate, and we find that ten thousand copies can be produced in about ten hours. But even this rate carries the publication of several thousands of the ten thousand into the next afternoon. We may, therefore ... that without triplicates, which we believe were ... resorted to, no daily paper previous to 1814 could ... at the sale of a greater number of copies than could be printed off even with duplicates in six hours—of which number the publication would often not be completed till after mid-day. The number printed of the most popular daily paper, would therefore be limited to five thousand, and this number could not be produced in time without the most perfect division of labour aiding the most intense exertion, provided that paper were ... by ... The 'Times' newspaper now pr... copies in two hours and a half, fro...

If the difficulties that existed ... siderable number of newspapers ... the printing machine were a... equally striking will the advant... appear when we consider its ... work as the 'Penny Magazin... that the instruction of the peo... interruptedly in the schools of ... that the mechanical means for ... for knowledge thus created had ... ment. In this series of papers ... constantly to show that the price ... be sold depends in great part upo... of that book. But at the same ... in mind, that the number of an... produced must be limited by th... production. If the demand for ... the establishment of the 'Penny ... invention of the printing machine, it ... sale of twenty thousand copies would ... dered the utmost that could have been ... This invention has forced on oth... printing, and larger presses have ... structed to compete in some degree ... the machine for printing a large fo... years ago there probably was no p... enough to work off a double ... Magazine.' One thousand perfect ... could only have been daily produced ... labour of two men. The machi... thousand copies. If the demand ... the 'M... zine,' printed thus slowly by the press, ... twenty thousand, it would have required tw... produce that twenty thousand in the same ... ten days, in which we now produce one hu... sixty thousand by the machine; and it wou... quired one press to be at work one hun... days, or sixteen presses for ten days, to ... results as the machine now effects in ten ... point of fact, such a sale could never ha... under the old system of press-work. ... as compared with the machine, would in... least forty per cent. to the cost of produ... sixteen presses could have been set in mo... stereotyping, no attempt ... them in motion; for ... and of re-composing ... commercial limit to ... the numbers printed ... time required for th... in the same wa...

* 'Nichols's Literary Anecdotes,' vol. i., p. 303.